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LEAFLETS

OF

PHILIPPINE BOTANY

Edited by A. D. E. ELMER, A. M.

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MO. BOT. GARDEN
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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

Vol. II. Manila, P. I., September 12, 1908. Art. 17.

SOME INTERESTING LAURACEAE

BY

A. D. E. ELMER.

—o—

ACTINODAPHNE NEES

Actinodaphne microphylla Elm. n. sp.

Strict, 8 m. high tree; wood soft, yellowish except the extreme whitish sapwood, odorless, somewhat bitterish; bark mottled; branches ascending, numerous, the ultimate ones slender and lax, smooth and whitish gray except the brown tomentulose tips. Leaves coriaceous, dark lucid green and slightly conduplicate on the upper side, ascending, the entire margins involute especially towards the base, glaucescent or yellowish green beneath, glabrous, quite variable in size, the larger ones 1 dm. long, 2 cm. wide, lanceolate to oblanceolate, occasionally subfalcate, acuminate at apex, slenderly tapering toward the base, numerous, and chiefly at the ends of the twigs; petiole slender, 1 to 1.5 cm. long, yellowish, glabrous, grooved along the upper side; midvein brown, very prominent beneath, grooved on the upper side; the lateral ones very obscure and irregular in number. Inflorescence ascending, spicate, less than 5 cm. long, strict, solitary from the axils of the conspicuous leaf scars on the twigs beneath the foliage, glabrous; pedicels less than 8 mm. long, divaricate, straight or recurved, alternating but more numerous towards the apex, brown puberulous in the young state but soon becoming glabrous; the subtending bracts caducous, 2 mm.

long, sparsely short brown pubescent on the outer side, leaving conspicuous scars; buds subglobose, 5 mm. thick; involucral bracts 4, yellowish, broadly ovate to elliptic, 5 mm. long, glabrous, deeply spoon shaped, with comparatively thin margins, sprinkled with minute reddish hairs especially at the base, subtending 5 flowers; flowers subsessile or upon short reddish pubescent pedicels; perianth segments 6, oblong, occasionally unequal, oblong, covered with short reddish brown hairs especially towards the base, dotted above the middle, 3 mm. long; stamens about 9 to 10, the 6 to 7 outer ones eglandular, the 3 inner ones provided at the base with a pair of broadly clavate short stipitate glands or excrescences; filaments filiform, 3 mm. in length, reddish brown hirsutulose, the series somewhat shorter; anthers all introrse, 2 mm. long, 1 mm. wide, oblong, the ends similarly subtruncate, 4-celled, the cells opening by hanging lids from the upper end, the upper pair of cells on the ventral side, the lower pair nearly on the lateral side; pistil glabrous, superior or only the basal portion sunken into the perianth, 3 mm. long; the thick style not distinct from the elongated ovary, bearing a woolly somewhat expanded stigmatic surface; fruits not seen.

Type specimen 10178, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

Of this species only one tree was noticed on the northern side of a dry rocky wind swept ridge at 3250 feet altitude. The bud state of it was observed for two or three weeks prior to anthesis. In some of the larger flowers are 10 stamens while a few of the smaller ones contain only 6.

ENDIANDRA R. BR.

Endiandra arborea Elm. n. sp.

A large 8 to 12 m. high tree, branched above the middle; the ultimate branchlets slender, rather numerous, covered with gray bark, only the young tips short cinnamon brown tomentose; wood soft and easily breaking; bark smooth and yellowish. Leaves alternatingly scattered, rigidly chartaceous,

glabrous, the entire margins subinvolute, oblongish to broadly lanceolate or oblanceolate, acutely tapering towards both ends or cuneate at the base, the apex occasionally acuminate and terminated by a rounded point, 6 cm. wide across the middle, 15 cm. long, but frequently larger or even smaller; nerves about 7 pairs, mostly alternating with secondary ones, very prominent beneath, tips very obscurely united, finely and strongly reticulate on both sides; petiole stout, 1.5 cm. long, brown pubescent when young but soon wearing glabrous, channelled along the upper side; fruits usually solitary, pendulous, upon 3 to 5 cm. long peduncles, smooth, hard, coal black, a trifle flattened, 2 cm. in diameter, 5 cm. long, equally rounded at both ends, elongated.

Type specimen 7268, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

Much resembling *E. coriacea Merr.*, the only other Philippine *Endiandra*, but the leaves are more tapering and fruits twice as long.

LITSEA LAM.

Litsea plateaefolia Elm. n. sp.

Tree, 15 m. high; branches mostly toward the top, quite rigid and comparatively short; twigs smooth, green, turning dark brown in the dry state, angular towards the ends; bark reddish beneath the epidermis, its surface brown and quite smooth; wood light, yellowish, with a distinct peppery green odor. Leaves recurved or ascending, coriaceous, dark green and lucid on the upper surface, duller beneath, turning blackish brown when dry especially on the upper surface, alternatingly scattered along the branchlets, quite variable in size, the normal ones 18 cm. long by 6 cm. wide across the middle, broadly lanceolate or oblong, apex acute to acuminate, base rounded or short obtuse, the entire margins subinvolute, petiole varying from 1 to 3 cm. long, glabrous, stout, caniculate on the upper side; nerves smooth and brown, oblique, 11 to 15 pairs, more conspicuous beneath, the tips obscurely united, reticulations obscure. Inflorescence upon racemose spikes 1 dm. long or less, solitary from the leaf axils, or alternatingly arranged along the twigs beneath the foliage or towards

the ends of short lateral branchlets, ascending; pedicels rather evenly scattered but more numerous towards the ends, divaricate or recurved in anthesis, puberulent or glabrous, buds short ovoid, 4 mm. long, subglabrous; bracts minute, caducous, thick, short yellowish tomentulose on the outside, acute; involucral bracts 4, ultimately spreading, elliptic, 6 mm. in length, the edges strongly folding over the ventral side, glabrous or only puberulous, coriaceous; calyx cup turbinate, 3.5 mm. long, short stipitate, finely pubescent with olivaceous hairs; segments punctate, 1.5 mm. long, oblong to obovate, mostly 6; stamens 9; the outer 6 filaments without glands, about 2 mm. long, glabrous, more or less flattened above the middle; the inner whorl of 3 very short and provided with a pair of large glands or excrescences; pistil 4 mm. long, thick, gradually tapering from the base; the true style 1 mm. long, usually curved, bearing a large flattened irregularly lobed or subentire stigma; fruit not seen.

Type specimen 9921, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

Discovered near a small waterfall along the Bonyao River bank at 2500 feet. The natives call it Bacan-ihalas. It is intermediate between *L. perrottetii* (*Blm.*) *F. Vil.* and *L. obtusa Vid.* but sufficiently distinct from either.

Litsea quercoides Elm. n. sp.

Erect tree, 10 m. high, with stems 3 dm. thick; bark smooth, brown, mottled; branches chiefly towards the top, crooked, the slenderer twigs rigid; wood easily cutting, yellowish throughout, odorless, Leaves very rigid, glabrous, dull green above, glaucescent beneath, variable in size, entire, lanceolate to oblanceolate or oblongish, the average ones 16 cm. long, 5 cm. wide across the middle, acuminately tapering at both ends, flat; petiole 1.5 cm. long, at first puberulent along the lower side and smooth, thickened gray and checked when old. Inflorescence not exceeding the petiole, axillary or arranged along the twigs; stalks stout, less than 1 cm. long or sometimes very short, 3 mm. thick, usually short cinnamon brown tomentose; pedicels occasionally as long as 5 mm., thick, similarly tomentose; bract deciduous, 2 mm,

long, thick and rigid, the outer surface covered with a short dense brown pubescence, the upper or deeply convex surface glabrous, subtending about 5 flowers; buds globose, 3 mm. in diameter; insolucral bracts 4, base narrowed, brown tomentulose on the exterior except along the thin overlapping margin and on the deeply convex upper surface, about 5 mm. long, elliptic or broadly obovate; perianth segments 6, oblong, at most 3 mm. long, 1.5 mm. wide, short ciliate along the margin and somewhat scattered over the dorsal side; stamens 12, erect, inserted in series upon the perianth; anthers introrse, oblong with subtruncate ends, flattened, 1 mm. long, the 4 cells opening by spatulate lids hanging from the upper end; the filaments of the 6 outer stamens glabrous, 1.5 mm. in length, eglandular; the filaments of the innermost stamens only one half as long, also glabrous, provided towards the base with a pair of very large glands or excrescences; ovary elongated ellipsoid, deeply sunken in the calyx cup; style 1.5 mm. long, strict, subcompressed, glabrous, equalling the shorter stamens, terminated by a more or less flattened stigmatic surface; calyx of fruit 1.5 cm. long, as wide across the top, the upper portion cup shaped, the basal one half much constricted, the rim rather sharp, scaly; nut ellipsoid, 2.5 cm. long, 1.5 cm. thick across the middle, the basal one half inserted in the calyx cup, similarly rounded at both ends, hard and smooth, shining, coal black or a dull bluish purple.

Type specimen 10329, *A. D. E. Elmer*, Dumaguete Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908. Also specimen number 9961.

Discovered in dense woods and on nearly inaccessible shrubby ridges at 4000 feet. This species is said to contain "Segunda clase cahoy", and is known to the natives as Bohian. Apparently it is a close relative of *L. albayana Vid.* but without the very slender petioles bearing blades which are puberulous beneath and more variable in size and much thicker in texture; reticulations of our leaves not prominent nor the nut globose. The foliage and cupular fruits are very similar to some species of *Quercus*.

Litsea membranacea Elm. n. sp.

Slender erect tree, 18 m. high; with white, rather soft wood and large pith; bark smooth and brown; branches slender, divaricate, sparingly branched, the ends usually suberect. Leaves membranous, spreading in a whorl at the ends of the shoots, rarely persistent on the second year old twig, flat, glaucous green beneath, broadly oblanceolate, apex acute. base obtuse or acute, soft cinereous pubescent beneath, also short pubescent on the upper surface when young, but becoming glabrous except along the caniculate nerves, 3 dm. long, from 4 to 9 cm. wide above the middle, unequal in size; nerves pinnatiform, about 10 on each side, ascending, the midvein very prominent, the cross bars not conspicuous; petioles 2 cm. long, soft brown pubescent as is also the soft growing shoot. Flowers 3 to 5 in a head, clustered on short tubercles along the 2 or 3 year old branches; peduncles 8 mm. long; similarly pubescent, split into 4 to 5 segments, coriaceous; pedicels 4 mm. long, comparatively thick; perianth cup fleshy, pubescent on the interior as well as on the exterior; its segments about 6, obovate or elliptic, 3 mm. long. pubescent or the outer side towards the base, punctate and reflexed; stamens very short, discoid, more than 12 to 16, inserted a trifle below the throat, sudtended by ciliate yellowish hairs and numerous filiform appendages; anthers 4-celled, introrse; fruit not seen.

Type specimen 8961, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

In dense humid woodlands below Balete a small settlement three miles west of Sablan. The Igorrotes call it Tawaco. It has also been collected by *Mrs. Clemens* in the Lake Lanao region, Mindanao.

Litsea tayabensis Elm. n. sp.

A 10 m. high tree; branches few, scattering, the branchlets in subwhorls, the terminal portion of the twigs densely covered with soft umber colored hairs; wood moderately hard, yellowish. Leaves rigid, glaucous and soft yellowish pubescent beneath, shining green above when mature except the nerves which are usually covered with a short silvery gray

tomentum, entire, oblong to broadly oblanceolate to even subovate, apex gradually tapering into an acute to acuminate point or in the obovate blades abruptly acute, base obtuse to subcuneate, 25 cm. long, 9 cm. wide at or immediately above the middle, the younger blades soft reddish brown pubescent on both sides; petiole as long as 3 cm., thick, covered with dirty hairs; nerves 5 to 7 or even 9 on a side, very oblique, prominent beneath, tips barely united, cross bars numerous and comparatively prominent, all densely ferruginously pubescent; bracts on the young twigs and between the whorls of the foliaceous leaves 3 cm. long, linear, brown, soft pubescent on the exterior, glabrous on the inner, caducous. Inflorescence in the leaf axils but chiefly in the axils of fallen leaves of the two year old twigs, clustered, 1. 5 cm. long or a trifle longer, at the base subtended by numerous glabrous rather stiff imbricated persistent bracts; peduncles 5 mm. long, densely pubescent; pedicels about 4 in a cluster, very similar except thinner, subtended by a whorl of 3 to 5 involucral bracts; these nearly equal the peduncles, elliptic, brown, the middle outer side short brown pubescent, glabrous on the inner side and along the thin margins, imbricate, caducous; perianth brown, united near the base, glabrous on the inside, pubescent on the exposed outer side, about 4 mm. in length, the 7 oblong segments ultimately subdeflexed; fertile stamens 9; filaments 4 mm. long, subflexuose, the lower 3 mm. conspicuously hairy, all inserted upon the base of the perianth; anthers finely faveolate, 1. 5 mm. long, basifixed, truncate at the base, persistent, pointed at the apex, turning brown with age; the lower pair of cells larger, the upper pair obliquely superposed, all opening by lids suspended from the upper end; basal glands or appendages of the third series of stamens flattened, more or less rugose, fleshy, glabrous, 1. 25 mm. long.

Type specimen 9194, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

Just recently I collected it in the woods of Cuernos Mountains, Negros Oriental, where it grew to a large sized timber tree.

Litsea griseola Elm. n. sp.

Large spreading tree, 15 m. high; branchlets smooth longitudinally striate, rather sparse, thick, heavy, watery; bark gray or mottled, thick, checked, that on the twigs brown; wood soft, white, with a large pith. Leaves conduplicate on the upper side, coriaceous, smooth above, much paler or yellowish green beneath and when young densely but with a very short tomentum, alternate, mostly on the ends of the twigs, oblong to ovately lanceelate, apex bluntly obtuse, the basal one half rather abruptly extended into a cuneate base, the medium sized blades 3 dm. long, 1 dm. wide across the middle; petiole glabrous, scarcely longer than 1 cm., very thick, deeply grooved on the upper side; midvein very prominent beneath, caniculate on the upper side towards the base; lateral nerves 13 to 17 on each side, slightly ascending, the apical portion strongly curved, very obscurely united if at all, reticulations very obscure; fruits on a rigid subpaniculate 3 to 5 cm. long infrutescence, scattered along the branchlets or in the lower leaf axils; peduncles and pedicels stout, covered with soft yellowish brown adpressed hairs, the pedicel about 5 mm. long; calyx cup turbinate, in young fruit subtruncate at apex, 15 mm. high, at least that across the top, green, hard, thick; nut apparently turning whitish when mature.

Type specimen 9242, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

It was discovered on a steep slope of the wooded canyon along the road towards the barrio of Sampaloc. Distantly related to *L. garciae Vid.*, but our leaf bases are not obtuse nor subauriculate; neither is the infrutescence on our specimen a 10 cm. long axillary raceme. *Mrs. Clemens* secured a good series of it in the Lake Lanao region of central Mindanao.

NEOLITSEA (BENTH.) MERR.

Neolitsea intermedia Elm. n. sp.

Numerously and fastigiately branched shrubs, 3 or more meters high, with soft white wood; bark smooth, grayish white, that on the twigs covered with a soft yellowish gray

tomentum; ultimate branchlets subverticellate. Leaves similarly arranged, from 3 to 7 or even 11 in a whorl, ascending, subcoriaceous with wavy margins, glaucous green beneath, lucid and glabrous above, when young covered beneath with a dirty white floccose pubescence which with age may entirely disappear, oblanceolate, 18 cm. long, 4 cm. wide, apex obtuse, base acute, gradually tapering towards both ends; nerves 9 to 13 on each side of the prominent midvein; petiole quite thick, fluted, about 2 cm. long, densely covered with a light brown pubescence. Inflorescence in small clusters along the second year old twigs, 7 to 11-flowered, never more than 15 mm. long; peduncles 4 mm. long, radially spreading, densely brown pubescent, subtended at the base by minute dry scales; pedicels about as long, umbellulately 1 to 3-clustered upon the peduncles; calyx 4 mm. long, gradually tapering into the pedicel, pubescent on the interior; perianth of 5 to 6 segments, the segments ovate to orbicular, 2 mm. long, tomentose on the lower side, rotately spreading; sterile stamens alternating with the perianth segments and inserted upon its throat; ovary cup stipitate, sparsely ciliate, the stigma only slightly protruding; fruits obovoid, ripening and turning yellow from apex to base; cup persistent, thick, yellowish green.

Type specimen 8832, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

On a dry barren ridge along the trail two miles above Sablan. The Igorrotes call it Basog. It has the leaves of *N. vidalii Merr.* and the inflorescence of *N. zeylanica C. et N.*, but the Philippine specimens called by the latter name have smaller more glabrous and acuminate leaves.

PERSEA PLUM.

Persea (Alseodaphne) leytensis Elm. n. sp.

Tree, 6 m. high, with a round toppeed crown; branches rigid, warty, covered with grayish white bark. Leaves usually crowded towards the ends of the twigs, coriaceous, unequal, the smaller ones oblanceolate and with acuminate apices, the larger ones obovate, apex abruptly acute, base obtuse or acute, 18 cm. long, 8 cm. wide above the middle, darker green

above, edges entire, glabrous; veins prominently raised beneath, ·5 to 7 on each side of the conspicuous midrib, reticulations quite evident; petiole stout, glabrous, 1 to 2 cm. long, easily falling and leaving large scars; fruits axillary, pendulous, pyriform, upon stout 1 to 3 cm. long peduncles, hard, green, finely spotted with lenticels especially towards the apex, but turning purplish when mature, the largest ones seen 15 cm. long and comparatively thick but most of them were much smaller and probably younger, 1-celled, 1-seeded; the seed subplano to convex, with hard and thick cotyledons.

Type specimen 7195, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

To this species are referred *Sr. J. F. Quadra's*, numbers 220 from Surigao and 95 from Placer, Surigao, Mindanao; also his 177 from the island of Dinagat, collected in 1901. On the ticket of the former specimens is written the vernacular name Jindang and on that for the latter specimen Cubi-cubi. All these specimens have similar 4-celled anthers. Our fruiting specimen is apparently distinct from all other congeners.

Persea philippinensis (Merr.) Elm.

Machilus philip-pinensis Merr. in Philip. Journ. Sc. 1, Suppl. 1; 56, 1906.

My numbers 7646 (in flower) and 8184 (in fruit) from Lucban are typical and the calyx in these specimens is not persistent.

LEAFLETS OF PHILIPPINE BOTANY

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THREE NEW LIVERWORTS

BY

FRANZ STEPHANI

(Leipsig, Germany)

—o—

Anthoceros elmeri Steph. n. sp.

Planta monoica, minor tenera fusco-viridis. Frons ad 15 mm. longa, oblonga, parum ramosa cavernosa; costa postice tuberifera valida, sensim in alas attenuata, marginibus unistratis repandis crispatis. Capsulae geminatae, 2 cm. longae. Involucra 5 mm. longa anguste cylindrica, crassa sublevia. Sporae 36 *u* pallidae grosse papillatae. Pseudo-elateres reticulatae. Androecia aggregata in ramis propriis vel capsulis approximata, caveruis magnis monandris. Antheridia gigantea breviter stipitata.

Type specimen 8447, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

Quite common on plane surface rocks covered with thin soil along streamlets of the pine region at 1750 meters.

Plagiochila elmeri Steph. n. sp.

Dioica spectibilis valida olivacea, corticola. Caulis ad 8 cm. longus, crassus, fuscus simplex, subflore simpliciter innovatus. Folia caulina 1.6 mm. longa, conferta disticha, recte patula, oblongo-trigona, basi 1.2 mm. apice 0.3 mm. lata circum-

circa spinosa, spinis posticis maximis longe attenuatis varie patulis, apiculibus parum brevioribus, anticis tenuissimis dense regulariterque consecutivis versus apicem in dentes brevibus mutatis. Auriculae posticae magnae inflatae marginibus planis anguste longeque hamatim-spinosis. Cellulae foliorum superae 36 *μ*, basales 36 by 54 *μ* trigonis majusculis attenuatis, basalibus validioribus. Perianthia in caule terminalia, uno latere innovata, oblongo-trigona, ore truncato regulariter spinoso, spinis validis consecutivis porrectis attenuatis. Folia floralia intima perianthio aequilonga caulinio similia grossius spinosa. Androecia ignota.

Type specimen 9343, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906.

Rather plentiful on small tree trunks and festoons thin half decayed limbs of trees in dense woods in damp ravines of Mount Banahao at 900 meters.

Trichocolea striolata Steph. n. sp.

Sterilis spectabilis flaccida pallida, dense caespitosa, corticola. Caulis ad 10 cm. longus, crassus levis, remote foliatus, regulariter pinnatus, pinnis remotiusculis dense pinnulatis, pinnulis brevibus versus apicem pinnarum sensim brevioribus, quasi frondem lanceolatam attenuatam formantibus. Folia ubique aequalia, minuta, profunde quadrifida, limbo basali integro 2 cellulas alto, laciniae 4 primariae validae, 3 lacinulis verticillatim insertis coronatae, iterum pinnatim setosis, pinnis remotis oppositis. Cellulae ut in congeneribus oblongo-rectangulatae; cuticula dense longeque striolatim-incrassata.

Type specimen 9288, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

Exceedingly common in woods of Mount Banahao at 1500 meters. It forms soft moss like mats about tree trunks, upon logs and loosely covers small limbs. Its color is a characteristic dull olive green or more ashy gray.

LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

Vol. II. Manila, P. I., October 30, 1908. Art. 19.

PTERIDOPHYTES OF THE HORN OF NEGROS

BY

E. B. COPELAND.

(Bureau of Education, Manila, P. I.)

—o—

The Horn of Negros is a mountain somewhat more than 1800 m. in height, situated at the extreme southern end of the island whose name it bears. Although surpassed in height by many mountains in the Philippines, it receives the winds from both the Pacific and the Sulu sea before they have lost their moisture, and has, accordingly, a very wet climate. *Mr. Elmer* states that its woods are the most humid in which he has ever collected. He collected there from March to June of this year, 1908. As he brought back about 180 species of Pteridophytes, the collection must give a fairly good picture of the group as represented on the mountain, and it therefore seems worth while to publish a complete list of his species.

In this collection are fourteen species which seem to be hitherto unknown, and three less distinct forms which are here described as varieties. Of the new species, three *Athyria* have just been described in my revision of that genus, and four *Hymenophyllaceae* are held for more complete study and comparison.

The strongest impression made by the study of this collection is that of the striking unity of the fern flora of the whole Archipelago. Although this collection seems to include

fourteen species new to science, I find in it only 5 species already known elsewhere but not reported from the Philippines; and of these five, only two are really collected here now for the first time. Four of these five species are Malayan. The other, the plant determined as *Gleichenia gigantea*, is known from India to China; but this will hardly be construed as evidence of direct floristic connection with the Asiatic mainland, both because its appearance here is far south in the archipelago, and because many authors regard *G. gigantea* as a form of the widely spread *G. glauca*.

Of *Pteridophytes* already known within and without the Philippines, this collection includes six species not previously found north of Mindanao, and eight or nine previously known in the Philippines only farther north, but the latter all occur in Malaya.

Of species known only in the Philippines, *Mr. Elmer* found on the Horn of Negros ten which had previously been found only in Mindanao, six previously collected only in Luzon, and five more which had not before been found as far south as this mountain. Beside these there are many species already known in Luzon and Mindanao, or Luzon, Mindoro and Mindanao, which are now found in this midway locality. These and others will no doubt be found on Canlaon in central Negros, and on Madiaas, in Panay, when the ferns of those mountains are collected.

Mr. Elmer's field notes are models in the full description of the environment, and of such features of the plants as might not be shown by herbarium specimens. As a large part of our rich fern flora is very local in its occurrence, each species having its characteristic kind of place, and as descriptions of the habitat are too often neglected, I am glad to summarize them, with the respective species, in the enumeration. For many purposes it is worth more to know that a given specimen grew "On the sheltered side of mossy trees, alt. 1800 m.," than to know that it was collected in the "Philippine Islands."

A notably large proportion of the ferns on the Horn of Negros have their rhizomes, or more properly caudices, erect; and many of these caudices are reported in the field notes

as reaching a greater height than they have been found to reach elsewhere. This peculiarity of the local ferns is obviously to be correlated with the extreme humidity.

POLYPODIACEÆ.

ACROPHORUS Presl.

Acrophorus stipellatus (Wall.) Moore.

In damp woods, alt. 1300 m., No. 9870.

Already collected on Apo, Halcon, and Data.

India, Malaya.

DRYOPTERIS Adan.

Dryopteris dubia Copel. in *Elmer's* Leaflets 1 (1907) 235.

On moist, usually loose soil, in humid woods, alt. 1200 m., Nos. 9604, 9713, 10102.

Previously known only from *Elmer's* Mount Banajao collection.

So far as the indusium is concerned this fern could as well be referred to *Acrophorus* as to *Dryopteris*. The field notes state that the rootstalk is erect, sometimes 30 cm. high, and occasionally branched.

Dryopteris intermedia (Bl.) O. K.

On damp, almost sheer slopes, alt. 850 m., No. 10166.

Luzon, Negros, Zamboanga.

Southern Asia, Malaya.

Dryopteris setigera (Bl.) O. K.

On steep slopes, usually in the sun, alt. 600 m., Nos. 9889 (a giant form), 9893, 9942. Local name "Locdo."

Throughout the Philippines. Common and variable.

China and Malaya.

Dryopteris sparsa (Ham.) O. K.

In rich soil in humid woods, alt. 1200 m., No. 10100.

Throughout the Philippines, but usually not in especially moist woods; *Elmer's* plants are thinner in texture than the others in these islands.

Southern Asia and Malaya.

Dryopteris metteniana Hieron. by *Christ* in Philip. Journ.

Sci. 2 C (1907) 210, *non* O. K.

In dry and in damp soil, near Bonyao river, Nos. 9856, 10024.

Large specimens are in all respects like *Cuming* 13, the type of this species; but small ones show that neither the pluriseriate sori nor the basiscopic enlargement of the pinnules or segments is constant. This being so, the plant is not very distinct from typical *D. syrmatica*.

Dryopteris motleyana (Hook.) C. Chr.

No. 10101a.

Southern Philippines.

Malaya.

Dryopteris quadriaurita Christ in Philip. Journ. Sci. 2 C (1907) 209.

No. 10101.

Atypical in that the basal pinnae are slightly deflexed. I have more typical material from Mt. Canlaon, Negros. Described from Zamboanga plants.

Dryopteris viscosa (J. Sm.) O. K.

No. 9990.

Mt. Apo, Mindanao; Mt. Halcon, Mindoro; Mt. Mariveles, Luzon.

Borneo and Malay Peninsula.

The caudex is sometimes 30 to 45 cm. high.

Dryopteris arida (Don) O. K. var. ebeneorhachis Copel. var. nova.

A typo stipite rhachideque glabrioribus ebeneis differt, lamina quam in plantis philippinis glabriore.

Alt. 750 m., No. 10411.

The species in the Philippines, Malaya and India.

Dryopteris unita (Linn.) O. K. (*Aspidium cucullatum Bl.*).

Alt. 650 m., No. 10411a. Sterile.

Throughout the Philippines.

India to Polynesia.

Dryopteris parasitica (Linn.) O. K.

Dry, gravelly soil, near Bonyao river, alt. 600 m., No. 9895.

Throughout the Philippines, common in damp, not too shaded places at low altitudes.

Pantropic.

Dryopteris luzonica Christ in Philip. Journ. Sci. 2 C (1907) 196.

On ledges or very steep slopes, alt. 600 m., No. 9865.

Luzon.

Dryopteris todayensis Christ.

In fertile soil of herbaceous thickets, alt. 1350 m., No. 9845.

This specimen is intermediate between the type from Mt. Apo and *Merrill* No. 6098, from Mt. Halcon, determined by *Christ* as this species. It has also been found in northern Negros.

The stout caudex is erect, 15 to 30 cm. high, and the stipe 1 m. high.

Dryopteris megaphylla (Mett.) C. Chr.

Rich soil along Bonyao river, alt. 750 m., No. 10009.

Mindanao, Mindoro, and Luzon.

Malaya.

The pinnae of *Elmer's* plants are cut half way to the costa, but I think it is safely referred to this species. The fronds reach a height of two m.

Dryopteris ferox (Bl.) O. K. var. calvescens Christ in Philip. Journ. Sci. 2 C (1907) 193.

No. 10182. Stipes 2 m. long, lamina 4 m.

The variety described from Zamboanga.

Dryopteris canescens (Bl.) C. Chr. var. lobata Christ, *ibid*. p. 198.

Rare in a wet, wooded depression, alt. 1350 m., No. 10204.

Luzon.

Java, Celebes.

Dryopteris canescens (Bl.) C. Chr. var. subsimplicifolia Christ, *ibid*. p. 199.

On cliffs near waterfall of the Bonyao river, alt. 850 m., No. 10278.

Luzon, Mindanao.

This impresses me as a valid species, near *D. lineata* and *D. Spenceri*.

POLYSTICHUM Roth.

Polystichum carvifolium (Kze.) C. Chr.
Damp soil in deep thicket, alt. 600 m., No. 9949. "Locdo."
Luzon, Mindoro, Mindanao.
Natal to Hawaii.

Polystichum horizontale Presl var. sordidum Copel. var. nova.
Forma maxima, rhachidibus glabrioribus pilis fere carentibus, paleis sordidis, vix rufis.
On trunk near the ground, alt. 1200 m., No. 9715. "Locdo."
The stipes are 30 to 100 cm. and the fronds 1 to 3 m. long.
A part of *Cuming* 180 is possibly this variety.

TECTARIA Cav.

Tectaria melanocaulon (Bl.) Copel. in Philip. Journ. Sci. 2 C (1907) 416.
On Bonyao river bank, alt. 750 m., No. 9854.
Luzon, Mindanao.
China to New Guinea.

Tectaria decurrens (Presl) Copel. *ibid.* p. 412.
Tufts on boulders along Bonyao river, alt. 750 m., No. 9853.
Luzon, Mindoro, Mindanao.
India and China to Polynesia.
"Short erect rootstalk, one to several inches thick."

Tectaria irregularis (Presl) Copel. *ibid.* p. 416. **var. Brogniartii.**
Alt. 600 m., No. 9948.
Luzon, Negros.
Malaya.

PLEOCNEMIA Presl.

Pleocnemia cumingiana Presl.
Forming great tufts, alt. 600 m., No. 10007.
Luzon, Mindanao.
Caudex 30 cm. or more high, 25 cm. thick, stipe 3 m. ong, frond as long. Doubtfully distinct from *Tectaria leuzeana (Gaud.) Copel.*

LEPTOCHILUS Kaulf.

Leptochilus heterochilus (Presl) C. Chr. var. Foxworthyi Christ in Philip. Journ. Sci. 2 C (1907) 160.

On mossy rocks near Bonyao river, alt. 850 m., No. 10041.

Luzon (this variety).

Leptochilus heteroclitus (Presl) C. Chr.

On rocks near Bonyao river, alt. 750 m., No. 9705. "Tagubuyoc."

Throughout the Philippines.

Subtropical Asia to Melanesia.

A part of this collection is the same as my No. 1543 from Zamboanga, determined by *Christ* as *L. diversifolius Bl.* I think *Mr. Elmer* is right in collecting them as the same plant. He observes, "An exceedingly variable species."

LOMAGRAMMA J. Sm.

Lomagramma pteroides J. Sm. var. subcoriacea Copel.

In deeply shaded ravines, alt. 900 m., No. 10175.

Rhizome growing from soil, much branched, scandent; the fronds heavy, coriaceous, the fertile usually terminal, not common.

This variety has been found in Mindanao and Paragua.

Lomagramma pteroides J. Sm. var. negrosensis Copel. var. nova.

Pinnis sterilibus cuneato-truncatis, late lanceolatis, quam typo brevioribus, herbaceis, grabrescentibus, fertilibus plerumque sessilibus, vix basin versus dilatatis.

Creeping over large boulders and ledges of a damp gorge, alt. 600 m., No. 9678. Local name, "Locdo-na-balagon."

In the plants from Luzon and Mindoro, which I regard as typical *L. pteroides*, the sterile pinnae are longer and narrowly lanceolate, the fertile for the most part stipitate and dilated at the base. The variety *negrosensis* differs from *subcoriacea* in thinner texture, permanently clear green color, and comparative nakedness, and from the type and var. *subcoriacea* in the non-cordate base of the less acuminate and less falcate sterile pinnae. Both of these varieties will probably prove to be good species, and would be so described, but that I have still other forms of questionable status.

DIPTERIS Reinw.

Dipteris conjugata (Kaulf.) Reinw.
Alt. 1300 m., No. 10193.
Throughout the Philippines.
Asia to Polynesia.

NEPHROLEPIS Schott.

Nephrolepis laurifolia Christ. (*N. biserrata var. laurifolia Christ* in Ann. Jard. Buiten. 15 (1897) 140).
On logs and boulders in dense thickets, alt. 750 m., No. 9859.
Central Luzon to Mindanao.
Celebes, Samoa.

The frond is 1 to 2 m. long, on a short stipe, and is spore-bearing only toward its apex. This name has never been formally published. It is used by me, Philip. Journ. Sci. 2 C (1907) 4, following a determination by *Christ* which indicated it as a species.

Nephrolepis barbata Copel.
Clusters on trunks in humid woods, alt. 1200 m., No. 10330, alt. 1800 m., No. 9729.
Mt. Apo, Mt. Halcon, Mt. Banajao. Always epiphytic.

OLEANDRA Cav.

Oleandra colubrina (Blanco) Copel.
Epiphytic, alt. 1100 m. and upward, No. 9959. "Loedo-balagon."
Central Luzon to Mindanao.
Java.

HUMATA Cav.

Humata vestita (Bl.) Moore.
Epiphytic in crater, alt. 1800 m., No. 9729. "Bananat."
Luzon, Negros.
Malaya.

Humata immersa (Wall.) Mett. var. amplissima Christ.
Alt. 1500 m., No. 9900.
The variety at similar altitudes, Luzon to Celebes; the species in Malaya and India.

DAVALLIA Smith.

Davallia solida (Forst.) Swtz.

Epiphytic in deep ravines, alt. 600 m., No. 9784.

Throughout the Philippines.

Malaya to Queensland and Polynesia.

Davallia embolostegia Copel. in Philip. Journ. Sci. 1 Suppl. (1906) 147, Tab. 3.

On mossy trunks and logs, alt. 1200 m., No. 9835. "Loc-do-bogtong."

Luzon, Mindoro, Negros.

Davallia wagneriana Copel.

Alt. 1200 m., No. 9974.

Mt. Apo, Mindanao.

This material is larger and more incised than the type collection, which seems not to have included fully grown specimens.

TAPEINIDIUM (Presl) C. Chr.

Tapeinidium pinnatum (Cav.) C. Chr.

Alt. 1200 m., No. 9831.

Throughout the Philippines.

Malaya, Polynesia.

The fronds of this collection have the most slender pinnae and segments I have ever seen.

BALANTIUM Kaulf.

Balantium Copelandi Christ in Philip. Journ. Sci. 2 C (1908) 301.

In humid woods, alt. 1050 m. to 1500 m., Nos. 9694, 10394, 9899. "Locdo."

Luzon, Province of Benguet.

The field notes of No. 9899, alt. 1500 m., say "Large tufts; rootstalk suberect, 1 foot long, a few inches thick; stipes ascending, 1 to 1.5 m. long, subterete, 1 inch thick at the base and densely covered with seta-like brown hairs." No. 9694, alt. 1050 m., is still larger, the caudex 30-60 cm. high, 15 cm. in diameter, the stipe 1 to 2 m. long, the frond 1 to 3 m., and the lowest pinnae 1 m. long. The typical Benguet plants are smaller, but differ in no other re-

spect. Some specimens were distributed by the Bureau of Science under the name *Dennstaedtia Elmeri Christ* which was never published.

DENNSTEADTIA Bernh.

Dennsteadtia articulata Copel. spec. nova.

Species D. erythrorachidi Christ affinis, ea statura majore, pinnulis in segmentis lobatis pinnatisectis, textura tenuiore, insertionibus pinnularum dense pubescentibus distincto.

Rhizomate, fide Elmer, supra terram repente, ramoso, fere 2 cm. crasso, nigro-fusco; stipitibus remotis, 1 to 1.5 m. altis, deorsum sparse nigro-aculeatis, supra insigniter canaliculatis; rhachidibus pernitidis castaneis, glabris, sulcatis, pinnarum pinnularumque conspicue articulatis, et in sulcis et densissime apud insertiones pinnularum et interdum segmentorum inferiorum pubescentibus; fronde ultra 1 m. alta, deltoidea; pinnis oppositis, ovato-lanceolatis; pinnulis oppositis, infimis diminutis, subsessilibus, acuminatis; segmentis pluris fere liberis, ala angustissima connexis, maximis 2 cm. longis, 8 mm. latis, oblongis, obtusis, glabris, papyraceis, leviter pauci-lobatis; venulis in segmento quoque 4-5-jugis, inferioribus furcatis; soris in sinubus loborum, 1 mm. latis vel paullo majoribus.

Horn of Negros Mountain, in very moist rich soil, alt. 1300 m., No. 9771.

This is distinguished from *D. erythrorachis* of Mindanao and Celebes as stated above. Its other Philippine relative, *D. Elmeri Copel.* of Luzon, has free secondary pinnules, narrower, more remote, more deeply cut, and more strongly auricled than the segments of *D. articulata*, no bunches of hairs at the articulations, and the rachises of the pinnae spiny and of the pinnules pubescent, while, except as already noted, both are smooth and naked in this species. I have not seen *D. ampla (Bak.) Bedd.* which is described as having rachises pubescent only in the groove, ultimate segments with 7 or 8 veinlets on a side, and without mention of articulations or of spines on the rhizome.

The local name given this fern is "Locdo-maitum" referring to its dark color.

SACCOLOMA Kaulf.

Saccoloma moluccanum (Bl.) Mett.

In ravines and dense woods, alt. 1100 to 1200 m., Nos. 10183, 9714. "Locdo-punko."

Luzon, Mindoro.

Malaya, Polynesia.

Caudex erect, 30 to 60 cm. high, 7 to 13 cm. thick, giving off numerous brown, wiry roots.

ODONTOSORIA (Presl) Fée.

Odontosoria chinensis (Linn.) J. Sm.

On rock exposures and steep banks, alt. 300 m., Nos. 9430, 9985. "Locdo."

Common in similar places throughout the Philippines.

Madagascar to Japan and Polynesia.

Odontosoria retusa (Cav.) J. Sm.

Gravelly wall of ravine, alt. 600 m., No. 9947. "Locdo."

From Luzon southward.

Malaya and Melanesia.

LINDSAYA Dry.

Lindsaya Merrillii Copel.

On trunks and stumps in very humid woods, alt. 1200 m., No. 9712. "Bananat."

Luzon to Mindanao.

These specimens are like *L. apoensis* in that the tooth of the fertile segment is rarely mucronate, and the distal segments are sometimes protracted. *L. apoensis* is possibly only a rain-forest form.

Lindsaya hymenophylloides Bl.

On trunks and stumps, with the preceding, alt. 1200 m., No. 9770. "Bananat."

From central Luzon southward.

Malaya and Polynesia.

Lindsaya cultrata (Willd.) Swtz.

On mossy rocks near a stream, No. 10276.

Common throughout the Philippines.

Madagascar to India and Australia.

The base of the stipe is sometimes as dark as in *L. adiantoides J. Sm.*, but the upper part of the rachis is always green.

Lindsaya cultrata var. minor Hook. Sp. Fil. 1;204.

Alt. 300 m., No. 9989.

This little variety is common in Negros, and seems quite distinct from typical *L. cultrata;* but in Benguet the gap between them is filled by intermediate forms.

Lindsaya monosora Copel. spec. nova.

La rigida affinis, pinnulis herbaceo-papyraceis, venulis haud salientibus, indusiis tenuibus distincta.

On lower or sheltered, moss-covered tree trunks, alt. 1400 m., No. 10077.

This is a very large *Lindsaya*, the brown stipe 20 cm. or more high, sparsely scaly at the base, the frond proper sometimes 50 cm. long with 3 to 5 pairs of subopposite or alternate, rather strict, acuminate pinnae, overtopped by the terminal one. The larger pinnules are 7 mm. long, 4 mm. deep, entire below, crenate on the upper side, provided each with a single sorus at the outer point or on the upper side near the outer point. The veins are free except that 2 or more coalesce in the base of each sorus. Beside differing as noted above, *L. rigida* has rather larger and broader pinnules, and sometimes more than one sorus on each. However, the species are so close together that if I had known *L. rigida* by description only I would not have called this distinct. The manner in which the veins of *L. rigida* stand out from both surfaces of the dried frond is not likely to be appreciated until it is seen.

Lindsaya decomposita Willd.

In wet woods, terrestrial, in ravines, alt. 1050 m., No. 9635, and in mossy forests, alt. 1450 m.

Throughout the Philippines.

India to Polynesia.

No. 9635 shows this plant to vary widely in a single place.

Lindsaya pulchella (J. Sm.) Mett.

A few meters from the ground on small trunks in damp woods, alt. 1200 m., No. 9773. "Bananat."

Throughout the Philippines.

Malaya to Samoa.

Elmer states that the fronds sometimes fork.

ATHYRIUM Roth.*

Athyrium Elmeri Copel.

Affine A. opaco (Don) Copel., quo stipite subviride, rhachidibus viridibus, fronde multo minore, graciliore, pinnulis obtusis, segmentis integris, sinubus apertis differt.

Rhizomate suberecto radices rigidas grisceo-atras emittente, paleis fuscis lanceolaties coronato; stipite ca. 20 cm. alto; apud basin paleaceo; fronde 30–40 cm. alta, 15–20 cm. lata, tripinnatifida, membranacea, glabra, pinnis acuminatis, infimis sequentibus aequalibus vel paullo diminutis; pinnulis infimis brevistipitatis, sequentibus, anguste adnatis, majoribus ultra mediam laminam incisis, apices versus fere integris; soris brevibus, irregularibus, prope costam pinnulae; indusio nullo.

On mossy water-worn rocks in ravines, Horn of Negros Mountain, alt. 1200 m., No. 10168.

Athyrium stramineum Copel.

Athyrium gregis A. nigripedis, rhachide sicco sorisque perpallidis, lamina membranacea nigra distinctum.

Radicibus rigidis ut videtur carentibus; stipite 30 cm. alto ad basin paleis brunneis paucis vestito, aliter glabro, vivo succulente, rhachideque viridibus; fronde 50 cm. alta, 20 cm. lata; pinnis pinnatis utroque latere ca. 8, stipitatis, majoribus 15 cm. longis, 5 cm. latis, acuminatis, infimis paullo reductis suberectis; pinnulis subobliquis, 25 mm. longis, 14 mm. latis, obtusis, fere ad costam incisis, medialibus anguste adnatis, distalibus decurrentibus, tenuissime membranaceis, infra saturate viridibus, supra fere nigris; segmentis oblongis, denticulatis; soris usque ad 3 mm. longis, oblongis costalibus, sparsis, indusiis angustis virido-albis fere omnibus asplenioideis; sporangiis pallide brunneis.

Damp fertile soil, Horn of Negros Mountain, alt. 750 m., No. 9703.

Athyrium geophilum Copel.

Filix A. Bolsteri affinis, sed multo minor, pinnulis paucis separatis cuneiformibus, rhizomate adscendente, basibus stipitum paleis paucis minutis pallidis vestitis.

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*For publication of names in this genus see Philip. Journ. Sci. 3 C (1908) 285. Diagnoses of *Mr. Elmer's* new species are reprinted here for the benefit of those who receive these collections but may not have access to the original publication.

Rhizomate 1–2 mm. crasso, radicibus basibusquei stipitum dense obtecto; stipitibus 2–6 cm. altis, nigris, filiformibus, deorsum paleis pallide fuscis 0.5 mm. longis sparsis deciduis vestitis, fasciculis vascularibus 2 usque ad laminam distinctis; fronde 5–8 cm. alta, 2 cm. lata, bipinnata pinnis utroque latere 5–8 pedicellatis vix auriculatis, apice rotundatis dentatisque, infimis reductis; pinnulis cuneiformibus, utroque latere 1–2 liberis, prima acroscopica maxima, rhachidi frondis parallela, dentatis dentibus 1–4, herbaceis, glabris, infra paullo pallidioribus; venulis in dentibus, nec non interdum in pinnulis, solitariis; soris asplenioideis, 1–3 mm. longis.

Horn of Negros Mountain, on wet earth under large, mossy rocks, alt. 1450 m., No. 9884.

I first mistook this for an *Asplenium* and the bundles of the stipe did not clear its affinity; but the paleæ, though pale, are of *Athyrium* type. Its generic position is finally established by its quite evident affinity to *A. Bolsteri* and *A. Williamsi*, and not to any species of *Asplenium*.

Athyrium meyenianum (Presl) Milde.

In tufts in ravines, alt. 750 and 850 m., Nos. 9626, 10010. "Paco."

Central Luzon to Mindanao.

Caudex erect, 15 cm. high. Stipes 1 m. long, fronds 1 to 2 m.

Athyrium sorsogonense (Presl) Milde.

Damp soil in thickets, alt. 1200 m., No. 10392.

Mindoro and southern Luzon southward.

India (?), Malaya.

Athyrium dolichosorum Copel.

Alt. 1050 m., No. 9958. "Locdo."

Luzon, Mindanao.

Formosa to India and Polynesia.

Athyrium oligosorum Copel.

On walls of ravines, alt. 1200 m., No. 9991.

Mt. Halcon, Mindoro.

Subcoriaceous; pinnae dark green above, sulphurescent or glaucescent green beneath. Not typical.

Athyrium fructuosum Copel.

In very humid ravines, alt. 600 m., No. 10006.

Zamboanga peninsula at same altitude.

Caudex 45 cm. high, 15 cm. thick, stipes 2 m. long, 3 to 4 cm. thick at the base and densely covered with soft dull brown trichomes above, green and smooth on the upper side, covered beneath with yellowish brown powdery scales which are easily rubbed off, and provided with blunt, rigid spines, frond 3 by 1.5 cm., "reduced at both ends and scattering toward the base."

Athyrium Blumei (Bergsm.) Copel.

In rich land, 550 to 750 m., Nos. 9869, 10245.

Throughout the Philippines.

India to Australia.

Caudex suberect, 30 to 60 cm. high, "A few inches thick," stipe green, heavy, spinescent, especially toward the base, fronds 1 to 3 m. long.

Athyrium esculentum (Retz.) Copel.

Alt. 300 m., No. 10115.

Throughout the Philippines.

India to Polynesia.

Caudex 30 cm. high, 5 cm. thick.

Athyrium tabacinum Copel.

Alt. 1200 m., No. 9717. "Locdo."

Known only from Mt. Apo, at the same altitude.

"Rootstalk a few inches high by an inch thick, stipes suberect, brown watery; fronds spreading, exceedingly variable; pinnae deep, dark green above, yellowish green beneath, flat, rigid and coriaceous."

Athyrium pariens Copel.

Alt. 1200 m., No. 9716. "Taguibuyoc."

Known only from Mt. Apo, at the same altitude.

"Caudex 3 in. high, 1 in. thick. This and *A. tabacinum* grow together; this always has more pinnae and thinner texture."

The two species also grow together on Mt. Apo, and I first collected *A. tabacinum* while mistaking it for *A. pariens;* but I afterward satisfied myself, as did *Elmer*, who did not

notice the venation, that there are constant differences which, once observed, are obvious enough. *A. tabacinum* has free veins; *A. pariens*, reticulate.

BLECHNUM Linn.

Blechnum egregium Copel.
Alt. 1050 m., No. 9695.
Central Luzon, Mindoro, Mindanao.
Caudex 30 to 60 cm. high, 12 cm. thick.

Blechnum Patersoni (Spr.) Mett.
Rich soil in dense woods, alt. 1200 to 1500 m., No. 10066.
From Luzon southward.
India to New Zealand.
Young fronds reddish.

Blechnum vestitum (Bl.) Kuhn.
On mossy soil in crater, alt. 1800 m., No. 9913.
Mt. Halcon, Mt. Mayon, and Mt. Apo.
Malaya.
Caudex erect, stout, 15 cm. high.

DIPLAZIOPSIS C. Chr.

Diplaziopsis javanica (Bl.) C. Chr.
Alt. 1200 m., No. 9605.
Mt. Apo and Mt. Halcon.
India to Polynesia.
Caudex short, erect, 5 cm. thick. A very ample form.

ASPLENIUM Linn.

Asplenium Nidus Linn.
Alt. 1200 m., No. 9830.

Exactly this form I have not seen before. The fronds are 1 to 2 m. long. The base is incomplete but apparently like that of *A. cymbifolium Christ*, which is the original *Thamnopteris musaefolia J. Sm.*, but not *A. musaefolium Mett.* The sori are fine, like those of *A. musaefolium Mett.*, but longer, but the base is very different.

Asplenium Phyllitidis Don.

Large tufts on the basal portion of trees in humid woods, alt. 1050 to 1200 m., Nos. 9720, 10357. "Tugundbuyoc."

Negros and Mindanao.
India.
Stipes very long.

Asplenium tenerum Forst.

On mossy boulders and bases of trees, alt. 600 m., No. 9866.
Throughout the Philippines, common.
India to Polynesia.

This collection includes the common form with rounded pinnae. With it and connected by gradations is a form with very acute, long pinnae and a prominent auricle 5 mm. or more long, which, if by itself, would pass easily for a distinct species. In more monstrous individuals this auricle becomes almost free, and more than 2 cm. long, and finally several lower pairs of pinnae may break up into pinnules connected only by a wing, each pinnule like a small pinna of a normal frond. In such freaks, the basiscopic pinnules are the largest ones.

Asplenium unilaterale Lam.

On mossy rocks in ravines, alt. 900 to 1200 m. and in moist woods, alt. 1400 m., Nos. 10013, 9602, 10209. "Bananat-sa-bato."
Throughout the Philippines.
Africa to Hawaii.

The three numbers of this collection seem to include two fairly distinct species, but I am not sure which, if either, is real *A. unilaterale*. No. 9602 is like the Japanese form. This group includes, in the Philippines, *A. excisum Presl*, *A. subnormale Copel.* (*A. fraternum Presl* nomen), and *A. filipes Copel.*

Asplenium pellucidum Lam.

In ravines at 600 m. and on ridges at 1200 m., No. 10256.

This is the elongated Javan form, not found so well devoloped farther north than Negros.

Asplenium persicifolium J. Sm.

On mossy bases of trees, alt. 1200 m., No. 9719. "Locdomagamai."
Luzon, Mindoro, Bohol (?).

Asplenium Lepturus J. Sm.

On mossy soil in damp woods, alt. 1350 m. and upward, Nos. 9895, 10081.

Luzon, Mindoro, Palawan.

No. 10081 comprises ferns which are typical *Lepturus* except in size, the fronds reaching a length of more than 120 cm. and the pinnae more than 15 cm. No. 9895 includes some large specimens with almost hastate pinnae. The same form is included in *Cuming's* No. 128, the type number of *A. anisodontum Presl*; but *Presl's* description better fits an essentially different fern of the same collection and number.

Asplenium laserpitiifolium Lam.

Along the Bonyao river and in ravines, alt. 750 to 900 m., Nos. 9855, 9741. "Damulmog."

Throughout the Philippines.

Malaya to Polynesia.

Rhizome short, thick, suberect; stipes 30 to 90 cm. long, shiny black; frond longer than stipe.

SYNGRAMMA J. Sm.

Syngramma alismaefolia (Presl) J. Sm.

On rich humus in forest, alt. 1200 m., No. 9796. "Locdobai," i. e., filix femina.

Central Luzon, southward, nowhere common.

Malaya.

CONIOGRAMME Fée.

Coniogramme fraxinea (Don) Diels var. Copelandi Christ in Philip. Journ. Sci. 2 C (1907) 171.

In very wet ravines, alt. 900 m., No. 10208.

Mindanao, Luzon, teste *Christ*.

Fronds 1 to 3 m. high.

ADIANTUM Linn.

Adiantum philippense Linn.

On mossy talus beds along Bonyao river, alt. 600 m., No. 9858.

Throughout the Philippines.

Almost pantropic.

Adiantum caudatum Linn.

Alt. 750 m., No. 9575. "Tolacdo."

Throughout the Philippines.

Africa to New Hebrides.

PLAGIOGYRIA (Kze.) Mett.

Plagiogyria tuberculata Copel. in Philip. Journ. Sci. 1 Suppl. (1906) 153. **var. gracilis Copel. var. nova.**

Planta typo luzoniense gracilior et minor, aliter non diversa.

Fertile soil in crater, alt. 1800 m., No. 9740. "Locdo."

The most robust and largest of *Elmer's* plants is much smaller and less stout than the least of mine from Mt. Data.

PTERIS Linn.

Pteris ensiformis Burm.

In bamboo flats, No. 9506. "Locdo-magamai."

Throughout the Philippines.

India and China to Polynesia.

Pteris excelsa Gaud.

Damp gravelly soil along the Bonyao river, alt. 750 m., No. 9864.

Central Luzon, Palawan, Mindanao.

India across Polynesia.

Pteris tripartita Swtz.

Loose soil along the Bonyao river, alt. 300 m., No. 10420.

Throughout the Philippines.

Africa to Polynesia.

Abacá (*Musa textilis*) may be expected to grow well where this fern thrives.

HISTIOPTERIS (Agardh) J. Sm.

Histiopteris incisa (Thunb.) J. Sm.

Rich soil around a spring, alt. 1200 m., No. 10331.

On many Philippine mountains.

Pantropic.

PTERIDIUM Gled.

Pteridium aquilinum (Linn.) Kuhn.

In thickets bordering open ridges, alt. 900 m., No. 10349.

Throughout the Philippines, appearing occasionally from sea level up to 2000 m.

Cosmopolitan.

Plant 2 to 3 m. high.

ANTROPHYUM Kaulf.

Antrophyum plantagineum Kaulf.

Epiphytic in a damp gulch, alt. 600 m., No. 10259.

Mindanao.

India to Polynesia.

Antrophyum parvulum Bl.

On mossy boulders in deep ravine, alt. 900 m , No. 10031.

Mindanao.

Java.

Fronds suberect, with recurved tips.

Antrophyum reticulatum (Forst.) Kaulf.

Epiphytic in ravines, alt. 600 m., Nos. 9857, 10110.

Common in the Philippines.

Madagascar to Polynesia.

Elmer's collection, which I regard as this species, includes *A. Clementis Christ* in Philip. Journ. Sci. 2 C (1907) 175, and approaches *A. parvulum Bl.*

MONOGRAMMA Schkuhr.

Monogramma trichoidea J. Sm.

No. 9474. "Malabohog."

Luzon, Mindoro, Mindanao.

PLEUROGRAMME Presl.

Pleurogramme loheriana Christ in Bull. Herb. Bois. II. 6 (1906) 1006.

Alt. 1300 m., No. 10086.

Luzon, Mindoro, Mindanao.

The fronds of this collection are the longest and the narrowest yet known.

VITTARIA Smith.

Vittaria alternans Copel. in Philip. Journ. Sci. 2 C (1907) 157.

Dense tufts on mossy trees, alt. 800 m., Nos. 10214, 10393.

Mindanao.

Young fronds reddish when fresh.

Vittaria Merrillii Christ in Philip. Journ. Sci. 2 C (1907) 174.

Pendent from mossy trunks, alt. 800 m., Nos. 9860, 10165.

Luzon, Mindoro, Mindanao.

Fronds wavy, and sometimes even twisted.

Vittaria scolopendrina (Bory) Thwaites.

Large clumps pendent from mossy trees, alt. 1200 m., Nos. 9718, 9963. "Manalo."

Catanduanes (leg. *Baranda*), Mindoro, Mindanao.

Africa to Samoa.

Stipes rigid, breaking with a snap.

Loxogramme (Bl.) Presl.

Loxogramme dimorpha Copel. spec. nova.

Species mirabilis cujus frons fertilis Vittariam simulat, sterilis Loxogramme typicalis.

Rhizomate ad truncos scandente et intertexto, 1 mm. crasso, radices multas villosas badias emittente, paleis lanceolatis apiculatis 6 mm. longis fumoso-castaneis vestito; stipitibus subnullis, pseudoarticulatis; fronde sterile ca. 30 cm. alta, sicca 2 cm. lata integra plana, viva 3 cm. lata undulata vel crispa, subcarnosa, acuta, supra mediam latissima deorsum costaque rufescentibus, supra valde plano-carinata; venis principalibus nullis, venulis laxe anastomósantibus, liberis inclusis paucis; fronde fertile angustissima, 40 cm. alta, 3-4 mm. lata, margine acuta, carnosa, carinata, parte tertia basale sterile, soro utroque latere uno, plerumque continuo, fere superficiale, paraphysibus paucis linearibus nec capitulatis, cellulis annuli 15-17.

In wet woods, alt. 1050 m., No. 9640.

This fern is a *Loxogramme* as certainly as it would be if it

fitted the usual diagnosis of that genus. Its inclusion makes *Loxogramme* difficult indeed to diagnose, but whoever attempts to simplify the matter should remember that we have already *L. parallela* whose sori are sometimes apparently parallel to the costa, but interrupted, that dimorphism sometimes occurs in *L. lanceolata*, and is characteristic of *L. iridifolia* (*Gymnogramme Christ*, Verh. Nat. Ges. Basel. 2 (1895) 248. Ann. Jard. Buitenz. 15: 170, Pl. 16); and that *L. conferta* is as dimorphous as this species and sometimes seems to have a single sorus parallel to each side of the costa.

Loxogramme has ever since *Blume* been suspected of affinity with *Antrophyum*; but this species suggests *Pleurogramme* as strongly, both in described characters and in the more elusive ones such as the bearing of the frond, as any of the older species does *Antrophyum*. Indeed, we have in the same island of Negros *Pleurogramme intermedia Copel.* (*Monogramme Copel.* in Philip. Journ. Sci. 1 Suppl. (1906) 225), a species, strikingly like, in aspect, to the fertile fronds of this, and which, like this, is without idioblasts in the epidermis.

By definition, the genus to which *L. dimorpha* would have had to be assigned is *Drymoglossum*, which, in part, is almost certainly a group congenetic with *Cyclophorus*.

Loxogramme lanceolata (Sw.) Presl.

Alt. 600 m., No. 10247.

Luzon, Mindanao.

Africa to Japan and Polynesia.

HYMENOLEPIS Kaulf.

Hymenolepis spicata (Linn. f.) Presl.

On mossy trunks, alt. 750 to 900 m., Nos. 10257, 9650. "Cabcabung."

Throughout the Philippines.

Madagascar to Polynesia.

No. 10257 is a single very diminutive specimen, the largest frond 65 mm. high, but fertile.

PROSAPTIA Presl.

Prosaptia contigua (Forst.) Presl.

On mossy stems in the "Fog belt," alt. 1500 m., No. 9888.

Throughout the Philippines.
Malaya, Polynesia.

POLYPODIUM Linn.

Polypodium jagorianum Mett.

On mossy branches, alt. 1300 m., No. 10085.
Luzon, Mindoro, Negros.
This is a very small form, but I think it is not separable.

Polypodium diplosorum Christ (*P. setosum* (*Bl.*) *Presl*).
On mossy trees, 1500 to 1800 m., No. 9734.
Central Luzon, Mindoro, Mindanao.
Malaya.

Polypodium congenerum (Bl.) Presl.
On mossy trees, 1500 to 1800 m., No. 9734a.
Not hitherto reported from the Philippines, but I have it also from Mt. Apo.
Malaya.

Polypodium pleiosoroides Copel.
On small, mossy trunks in crater, rare, alt. 1800 m., No. 10003.
Mt. Apo, Mindanao.
Perhaps too near *P. sumatranum Baker* in Journ. of Bot. 18 (1880) 214, but longer stalked.

Polypodium cucullatum Nees et Bl.
Near bases of mossy trunks, alt. 1450 m., No. 9879.
From central Luzon southward.
Ceylon to New Caledonia.

Polypodium negrosense Copel. spec. nova.
Rhizomate breve, ca. 1 mm. crasso, paleis fuligineis acuminatis ciliatis 1.5-2 mm. longis vestito; stipitibus confertis, occulte vel non articulatis, 1 cm. longis, nigris, pilis atropurpureis 0.5-1 mm. longis patentibus vestitis; fronde oblongo-lineare, 20 cm. alta, 2 cm. lata, maximis utrinque sat abrupte contractis, minoribus sensim angustatis, pilis minutis ubique pubescente et ciliata, spongiosa, translucente, fere ad costam pinnatifida, segmentis obtusis, integris, ovatis, apud costam 4 mm. latis; costa venisque omnibus immersis, venulis simplicibus marginem non attingentibus; soris in segmento

quoque 2-5, apicalibus, submarginalibus leviter immersis vel solummodo annulo circumdatis, pilis longioribus protectis.

Epiphytic on mossy trunks, Horn of Negros Mountain, alt. 1350 m., No. 10319.

Elmer says "This is the rarest of all the ferns found," and "Fronds soft, membranous, dry in texture," but this surely depends upon the weather.

This species is of the group of *P. khasayanum*, and is characterized by the rather sudden contraction at the base of the best developed fronds, and the restriction of the sori to the apices of the segments; further distinguished from *P. khasayanum* by the fact that the sori do not show on the upper surface, from *P. stenopteron Bak.* by the fact that they are not superficial and from *P. barathrophyllum Bak.* and *P. crassifrons Bak.* by the pubescence of both surfaces.

Polypodium subfalcatum Bl.

On mossy limbs, rare, alt. 1200 m., No. 9847.

Mt. Halcon, Mindoro.

India, Malaya.

This is a small form, about equally near to the typical *P. subfalcatum* and to *P. minutum Bl.* The latter was reported as collected in the Philippines by *Steere*, but is not represented in my set of his ferns; and I have what seems to be it from Mt. Data.

Polypodium obliquatum Bl.

Epiphytic in mossy woods, alt. from 1300 m. and upward, No. 9822a.

Common in the Philippines.

India, Malaya.

Polypodium celebicum Bl.

In mossy woods with the preceding. No. 9822.

Luzon, Mindoro, Mindanao.

Malaya.

Polypodium tenuisectum Bl.

On mossy limbs in the fog region, alt. 1500 m. and upward, No. 9887.

Mt. Apo, Mt. Canlaon, Mt. Halcon, Mt. Pinatubo.

Malaya to Samoa.

Polypodium papillosum Bl.
Alt. 750 m., No. 9867.
Luzon, Mindoro, Mindanao.
Malaya.

Polypodium subauriculatum Bl.
Terrestrial in thickets, alt. 1100 m., No. 10352.
Throughout the Philippines.
Malaya to Samoa.

"Stipe with two fine greenish lateral streaks." Two forms of distinct appearance are found under this number.

Polypodium accedens Bl.
Alt. 1200 m., No. 9721. "Manaog."
Common in the Philippines.
Malaya and Polynesia.

Polypodium nummularium Mett.
On sides of and beneath mossy branches, alt. 1200 m., No. 9967. "Cabcabung."
Mts. of La Laguna Province, and Mt. Halcon.

Polypodium lagunense Christ.
No. 10082.
Mt. Maquiling, Mt. Halcon, Mt. Silay.

The affinity of this and the preceding species is discussed in my paper on the ferns of Halcon, Philip. Journ. Sci. 2 C (1907) 140. Their discovery together here is very interesting.

Polypodium revolutum C. Chr.
Alt. 1200 m., No. 9798.
Luzon, Palawan, Mindanao.
Malaya to New Caledonia.

The choice of the proper name for this plant is no simple matter. It is, indeed, without doubt, "*Polypodium revolutum C. Chr.* Index 331, 1905; 559, 1906.—Malesia, Ins. Philip. N. Caledonia.—*Drynaria J. Sm.* 1841 (nomen); *Grammitis longifolia Bl.* Enum. 119, 1828." This is quoted from *Christensen's* Index, p. 559. As I construe it, *Christensen* found this plant without any name valid in the genus, *Polypodium*, in which he placed it. If the name is published on p. 331, this is clear, for there is no indication that the name *rev-*

olutum is transferred from any other source; it is valid in *Polypodium*, and is satisfactorily tied down to a particular plant by reference to *Blume's* well enough known *Grammitis longifolia*. The type specimen of *P. revolutum C. Chr.* is the type specimen of *G. longifolia* collected in western Java.

On the other hand, if publication is on p. 559, it is evident that the name *revolutum* is a transfer of *Drynaria revoluta J. Sm.* This is a nomen nudum, according to present general attitude, but even so it had a type, from Luzon (*Cuming* 247). It is difficult for me to see that the transfer of the name could change the type. The name applied to *P. revolutum C. Chr.* can certainly have a Javan type, but *P. revolutum* (*J. Sm.*) *C. Chr.* would have to have *Cuming's* No. 247 as its type. If, then, the Javan plants should turn out, upon fuller study, to be not conspecific with *Cuming* No. 247, then, *J. Sm.* being authority for the name *revolutum*, the Javan plant would have to be renamed. This being so, the citation of *Blume's G. longifolia* as a synonym does not fix *J. Smith's* name nor provide the Luzon plant with a diagnosis, nor remove it from the class of nomina nuda.

Under the circumstances, no botanist would knowingly rename the plant, and in the course of time it would be provided with a description. But *Christ* in Philip. Journ. Sci. 2 C (1907) 178 has thought he could distinguish differences between the plants collected in Mindanao and by me, P. J. S. 2 C (1907) 6, referred to *P. revolutum* (*J. Sm.*) *C. Chr.* and other plants called such by him; and has described the former as *P. productum*. As I had previously written my own opinion to *Dr. Christ*, and as *Elmer's* rich collection fully demonstrates, *P. productum* and *P. revolutum* are one species. If *P. revolutum* was *P. revolutum* (*J. Sm.*), and by the citation of *J. Smith* as authority, a nomen nudum, *Christ's* name *P. productum* is that which must now be given to it, here and in Java.

It is very evident, from Index 559 as quoted above, that *Christensen* meant to transfer *Smith's* name. If it had not chanced that *Blume's* generic name was *Grammitis*, which precedes *Polypodium* in an alphabetical arrangement, the transfer would have been clear from the start, and *Christ's* name would hold. But this would be a very technical ruling,

and since *Christ* never intended to replace *P. longifolium* or *P. revolutum*, I am carrying the technicality to the bitter end and upholding *P. revolutum C. Chr.* (incidentally *Drynaria r.* of *J. Sm.*) Index p. 331.

To sum up, my opinion is that *Christensen*, though he intended to transfer *Smith's* name, failed to do so, either because the plant incurred mention before he was ready for it, or because, as a nomen nudum, it was not subject to transfer; and that because he failed, the name he used will stand. But if he did succeed in transferring *Smith's* name, then *Christ*, in subsequently attempting to give a name to a plant regarded as distinct from *P. revolutum C. Chr.*, did give to the latter the only valid name it has. Are we not fortunate in having logical rules?

Polypodium validum Copel.

On rocks in ravines, alt. 600 m., No. 9946. "Manalo." Mindanao, Mindoro.

Polypodium heterocarpum Bl. non *Mett.* nec *C. Chr.*

On humus covered boulders by Bonyao river, alt. 750 m., No. 9868.

Luzon, Mindanao.

Java, Celebes.

Polypodium glauco-pruinatum C. Chr.

Alt. 1200 m., No. 9962. "Locdo."

Luzon, Mindoro.

Polypodium Phymatodes Linn.

On dead limbs in open woods, alt. 600 m., No. 10428.

Common in the Philippines.

Africa to Polynesia.

This is a very ample form, already collected in Mindoro and in the Batanes Islands.

Polypodium commutatum Bl.

Creeping on soil or mossy boulders, alt. 750 m., No. 9704. "Cabcabon."

Luzon, Mindoro, Mindanao.

Java.

Polypodium dolichopterum Copel.

On wet, mossy, water-worn boulders, alt. 1200 m., No. 10169.

Mindanao and Luzon.

This is *Drynaria decurrens Brack.*, but distinct from *Polypodium insigne Bl.*, which I have found on Mt. Canlaon.

Polypodium palmatum Bl.

On mossy stems in thicket, in crater, alt. 1800 m., No. 9911.

Throughout the Philippines.

Malaya.

Polypodium angustatum Bl.

On mossy trunks, alt. 1600 m., No. 9901.

Mindanao.

Malaya.

Polypodium albido-squamatum Bl.

On trees in open woods, alt. 1200 m., No. 9797. "Loc-do-na-guindin."

Luzon, Mindoro, Mindanao.

Malaya to New Guinea.

Polypodium caudiforme Bl.

On mossy trees in crater, alt. 1800 m., No. 9727.

Mindanao.

Malaya.

Sori smaller than usual.

CYCLOPHORUS Desv.

Cyclophorus adnascens (Sw.) Desv.

On dying tree in "hemp" field, No 9480.

Common in the Philippines, usually beside the sea.

India to Polynesia.

Cyclophorus varius (Kaulf.) Gaud.

On dead trunks on an open ridge, alt. 900 m., No. 10221.

Throughout the Philippines.

Malaya and Polynesia.

Cyclophorus Lingua (Thunb.) Desv.

Alt. 1200 m., No. 9804.

Luzon, Mindanao.

Range doubtful, depending on how the species is defined.

Of the forms recognized as species by *Giesenhagen* but not by earlier writers, this is nearest to *N. Warburgii*, from which it varies mostly in the direction of typical *C. Lingua*

Cyclophorus Sarasinorum (Gies.) C. Chr.

Tangled masses on large boulders.

Mindanao.

Celebes.

DRYNARIA (Bory) J. Sm.

Drynaria sparsisora (Desv.) Moore.

On small stems or stumps, alt. 600 m., No. 10034.

Collected by *Warburg* in Luzon and Mindanao.

Ceylon to Fiji.

DRYOSTACHYUM J. Sm.

Dryostachyum splendens J. Sm.

Alt. 1200 m., No. 10069.

Luzon, Mindoro, Mindanao.

Range in doubt because of confusion with *D. pilosum*.

"Often 45 cm. wide at the dry, parchment-like base."

Dryostachyum pilosum J. Sm.

No. 10012.

Luzon (according to label on *Cuming's* plant); Mindanao.

Range doubtful because of confusion with the preceding.

PHOTINOPTERIS J. Sm.

Photinopteris speciosa (Bl.) Presl.

On high trunks, alt. 600 m., No. 9785. "Locdo."

Luzon, Mindanao.

Malaya.

Rhizome said to be 0.75 inch thick when fresh. In the dried plant it is not one-third as thick.

ACHROSTICHUM Linn.

Achrostichum aureum Linn.

On ledges and elsewhere along the Ocoy river, alt. 300 m., No. 10294.

Throughout the Philippines, in salt marshes.

Pantropic.

ELAPHOGLOSSUM Schott.

Elaphoglossum Copelandi Christ in Philip. Journ. Sci. 2 C (1907) 176.

Tufts on mossy trees in ravines, alt. 800 to 1200 m., Nos. 9927, 10206. "Locdo."

Mindanao.

This is very near *E. petiolatum* (*Sw.*) *Urban*.

Elaphoglossum luzonicum Copel. in *Elmer's* Leaflets (1907) 235.

On mossy trunks, usually a few meters from the ground, alt. 1200 m., No. 9815. "Cabcabon."

Luzon.

Achrostichum decurrens and *A. obtusifolium* of various authors.

"When young, fringed with thin, brown scales," which are intramarginal in insertion. This dense border of scales gives the plant a very different aspect from the common Luzon plant, but as they are otherwise alike, and as some similar scales sometimes persist on the latter, I do not try to separate them. Cf. *Fée*. Mém. III. p. 55, as to "*E. decurrens.*" The plant discussed by *Fée*, is his *A. decurrens Junior*, *Cuming* 144. At the time I published *E. luzonicum* I had not seen this specimen of *Cuming's*, and did not suspect that I was renaming the same species. However, I am prepared to maintain the name I gave; for *A. decurrens* of *Fée*. Mém. II. p. 34 and of *Christ*, Monograph p. 51, is certainly not *A. decurrens* of *Blume*. *Desvaux* was the original author of the name, but as *Fée* based his determination on *Blume's* plate, and *Christ* followed *Fée* I feel safe in not going back of *Blume*. *Blume's* figure and description of *A. decurrens* are exactly matched by *Merrill's* No. 5853, from Mindoro, which is so distinct from even the naked forms of *E. luzonicum*, that *Christ* in Philip. Journ. Sci. 3 (1908) still following *Fée's* erroneous construction of *A decurrens*, has described this as a new species, *E. Merrillii*. The most tangible diagnostic difference between *E. decurrens* and *E. luzonicum* is in the shape of the paleae on the rhizome. *Blume* figures them for his *A. decurrens*, Flora Javae II. Plate X., as rather narrowly lanceolate, and says p. 33 "Paleae—lanceolatae acuminatae margine irregulariter setaceo-

lacerae." Yet *Fée*, usually the most careful of authors in such details, says these paleae are oval, and distinguishes *A. Cumingii* (*Cuming* 193, not 194, as stated by *Christ* Monograph p. 152), as having linear paleae. *Achrostichum obtusifolium* is a name by which various authors would have designated *E. luzonicum*, but according to *Presl* and *Christensen* the original *A. obtusifolium Willd.* is more likely to have been a *Leptochilus*.

Elaphoglossum callaefolium (Bl.) Moore.

No. 9815a. Sterile specimens mixed with the preceding.
Mindanao.
Java.

Elaphoglossum conforme (Sw.) J. Sm.

On mossy shrubs, etc., alt. 1400 m., No. 9885.
Reported from Luzon, but not known to me there.
Almost pantropic.

Key to Philippine species of *Elaphoglossum*.

1. Paleae of rhizome narrow, dark.
   2. Frond not very coriaceous, beset with stellate scales.
      3. Sterile fronds less than 3 cm. wide. — *E. petiolatum*.
      3. Sterile frond, more than 3 cm. wide. — *E. Copelandi*.
   2. Frond thick-coriaceous, glabrous or nearly so. — *E. callaefolium*.
1. Paleae of rhizome narrow but lighter and thin. — *E. decurrens*.
1. Paleae of rhizome broad, thin.
   2. Fronds close together.
      3. Fronds obtuse. — *E. luzonicum*.
      3. Fronds acute. — *E. conforme*.
   2. Fronds scattered. — *E. laurifolium*.

E. Blumeanum J. Sm. (*Achrostichum Fée* Mém. II. p. 62) *Cuming* 194 is *E. petiolatum*. *Fée's* specimen of this number evidently had a much shorter stipe than mine, but it can hardly have differed specifically.

E. Cumingii Fée is unknown to me; it may be *E. decurrens*.

My understanding of *E. laurifolium* (*Thours*) *Moore* is based on determinations by *Dr. Christ*. I cannot distinguish some of our specimens from *E. angulatum* (*Bl.*) *Moore*, as figured by *Blume*.

CYATHEACEÆ.

CYATHEA Smith.

Cyathea heterochlamydea Copel. spec. nova.

Arbor, caudice 3-5 m., alto, 5 cm. crasso; fronde sessile 1.5 m., longe, rhachide laete umbrina fere glabra, pustulis parvis scabra; pinnis maximis 30-35 cm. longis abrupte acuminatis, rhachidibus castanis, paleis minutis bullatis aliis lanceolatis basibus dilatatis 2.5 mm. longis castaneis sparsis vestitis, demum glabrescentibus, subscabris; pinnulis sese vix tangentibus subsessilibus, 7 cm. longis, ad basin 15 mm. latis, sursum angustatis, pinnatis, costa paleis lanceolatis 1.5 mm. longis, rarius et aliis minutis vestita; segmentis sinu angusto separatis, inferioribus paucis liberis, infimis brevissime stipitatis, 2-3 mm. latis, subfalcatis, acutis, apices versus obscure serrulatis, coriaceis, lamina glabra, supra atroviride, infra pallida; venulis utroque latere 4-6, soris costalibus 0.5-0.66 ad apicem segmenti attingentibus, 0.75 mm. latis; indusio castaneo unilaterale, sorum plerumque 0.5 interdum usque 0.66 circumdante.

Summit of Horn of Negros Mountain, alt. 1830 m., No. 9742.

The nearest relatives of this species are probably *C. Christii* and *C. negrosiana*, from which it is distinguished by the double pubescence of the secondary rachises and the peculiar "indusium." The scale which subtends and half covers the sorus appears to be homologous with the indusium of other species rather than with the paleae on the axes.

Cyathea fructuosa Copel. spec. nova.

Arbor, caudice 3-5 m. alto, 10 cm. crasso; stipite breve vel subnullo, ad basin paleis angustis valde apiculatis 2 cm. longis dense obtecto; rachide frondis supra setoso-paleacea, infra purpuracea scabra; fronde ca. 2 m. longa, 60-90 cm. lata, tripinnata; pinnis utroque latere 15-20, infimis reductis, rhachidibus infra asperis et squamulis minutis purpuraceis et paleis rufo-stramineis 5 mm. longis angustis vestitis, pupureo-brunneis; pinnulis I ca. 8 cm. longis, 20 25 mm. latis, sessilibus, acuminatis acumine serrato, costa supra velutina infra rufo-paleacea; pinnulis II plerisque liberis, inferioribus ad basin truncatis, obtusis, ca. 12 mm. longis, 2-2.5 mm. latis, sterilibus integris vel apices versus obscure crenulatis, fertilibus crenatis vel lobato-crenatis, costula deorsum infra squamulis bullatis vestita, supra glabra; lamina glabra, subcoriacea, infra pallida; venulis utroque latere 9-11, supremis 2-3 simplicibus, aliis apud costulam furcatis ramo superiore interdum iter furcato; soris globosis, totam paginam obtegentibus vel ad apicem carentibus; indusio ferrugineo, demum in segmentis magnis rumpente.

Horn of Negros Mountain, near summit of lesser peak, alt. 1700 m., No. 9988.

This species resembles *C. Loheri Christ*, which is more scaly and has the fertile and sterile pinnules alike.

Cyathea tripinnata Copel. in Philip. Journ. Sci. 1 Suppl. (1906) 251.

In moist woods, alt. 1200 m., No. 9457. "Locdo."

Mt. Mariveles and Mt. Halcon.

ALSOPHILA Brown.

Alsophila Elmeri Copel. spec. nova.

Arbor, caudice erecto, 10 m., alto, 10-15 cm. crasso; stipite breve, paleis setaceis 25-30 mm. longis 0.5 mm. latis atro-fuscis minute ciliato serratis dense obtecto, his setis circum cicatricem stipitis ad caudicem persistentibus; fronde, stipite incluso, 2-3 m. longa, rhachide infra straminea, spinis nigris basibus mammiforibus obsito, demum glabrescente ac squamulis furfuraceis sparsis vestita; pinnis 60 cm. longis, 25 cm. latis, rhachin versus vix angustatis, rhachidibus infra fulvis, sparse

minute furfuraceis, aculeatisque; pinnulis I maximis 13 cm. longis, 25 mm. latis, acuminatis, pinnatis, proximis et interdum imbricatis, costa supra pallido-setosa, infra paleis minutis stramineis bullatis ciliatis vel subintegris, aliis basibus concoloribus lanceolatis sursum latericiis setiferis haud dense vestita; segmentis subfalcatis rotundatis, 3.5 mm. latis, serrulatis, sinu acuto separatis, inferioribus ca. 4-paribus pinnulis liberis, infimis sessilibus non adnatis, costulis sparse pilis squamulisque bullatis albidis obsitis, venulis utroque latere 10-12, ca 4 supremis sterilibus simplicibus, aliis infra mediam furcatis in furcam soriferis; soris subcostalibus, 0.66-1 mm. latis, nudis.

Horn of Negros Mountain, common in forest at 1200 m. alt.. Nos. 9457, 10064.

This species is somewhat like *A. latebrosa*, but very easily distinguished by the peculiar pubescence. I suspect that it may be related to *C. Christii*.

Alsophila latebrosa Wall. (?)

Open thicket, alt. 1100 m., No. 10353.

Mindanao (var. *major Christ*).

India, Malaya.

This is a peculiar form, having the rachis glabrous beneath, as in *A. glauca*, but on the whole more like *A. latebrosa*.

DICKSONIA L'Herit.

Dicksonia Blumei (Kze.) Moore.

Alt. 1350 m., No. 9874.

Mindanao and Mindoro.

Java, Celebes.

Trunk 3 to 5 m. high, 15 to 20 cm. thick (fide *Elmer*), fronds 2 to 3 m. long, basal pinnae but little reduced.

HYMENOPHYLLACEÆ.

HYMENOPHYLLUM Smith.

Hymenophyllum eximium Kze.

On mossy logs and trees in crater, alt. 1800 m., No. 9910.

Luzon, Mindoro.

Java; range otherwise doubtful.

Hymenophyllum Junghuhnii v. d. B.
Beneath mossy trunks, alt. 1200 m., Nos. 10205, 10246a.
Luzon, Negros, Mindanao.
Java.

Hymenophyllum aculeatum (v. d. B.) Racib.
On rotten logs, alt. 1200. m., No. 9825.
Luzon, Mindoro.
Ceylon and Malaya.

Hymenophyllum serrulatum (Pr.) C. Chr.
On mossy trunks and logs, alt. 1200 to 1800 m., Nos. 9818, 9910a.
Luzon, Negros, Mindanao.
New Guinea.
No. 9910a is composed of very large specimens.

Hymenophyllum tunbridgense Smith.
On mossy trunks, alt. 1800 m., No. 9747a.
Mindoro.
England to New Zealand and Chile.

Hymenophyllum obtusum H. and A.
On mossy trunks, alt. 1400 m., Nos. 9987, 10062.
Mindoro, Luzon.
Hawaii, New Guinea.
No. 9987 is more like the Hawaiian type than is any previous Philippine collection.

Hymenophyllum pycnocarpum v. d. B. (?)
On mossy trees, alt. 1350 m., No. 10230.
Luzon, Mindoro, Negros.
Range doubtful.

Hymenophyllum productum Kze.
On mossy trees, alt. 1300 m., No. 10426.
Java.

TRICHOMANES Linn.

Trichomanes parvulum Poir.
On damp shaded cliffs, alt. 750 m., No. 9625. "Damulmog."
Luzon.
Madagascar across Polynesia.

Trichomanes pyxidiferum Linn.

On *Agathis* trunks near the ground, alt. 1200 m., No. 10265.

Common in the Philippines.

Pantropic.

Trichomanes gemmatum J. Sm.

Abundant in the crater, alt. 1800 m., No. 9841.

Luzon to Mindanao, in the mossy forest.

Malaya, New Guinea.

Trichomanes apiifolium Presl.

On bases of tree trunks, alt. 1350 m., No. 10067.

Throughout the Philippines.

Java.

Trichomanes maximum Bl.

Damp outcrops near Bonyao river, No. 9933. "Locdo."

From central Luzon southward.

Malaya to Queensland and Polynesia.

The brown stipes narrowly winged with green.

Trichomanes cupressoides Desv.

About boulders in damp woods, alt. 1400 m., No. 10229.

Common in the Philippines.

Madagascar to India and Malaya.

Trichomanes Cumingii (Pr.) C. Chr.

On the sheltered side of mossy trunks, alt. 1200 m., No. 10059.

Mindoro, Mindanao.

Moluccas.

Trichomanes pallidum Bl.

On the sheltered side of mossy trees, alt. 1400 m., No. 9989.

Luzon to Mindanao.

India to Polynesia.

Trichomanes javanicum Bl.

On wet ledges, alt. 900 m., o. 10269.

Common in the Philippines.

India to Liu Kiu and Polynesia.

There are also in this collection two apparently new species of *Trichomanes* and two of *Hymenophyllum* which I expect to describe in the near future.

SCHIZAEACEÆ.

SCHIZAEA Smith.

Schizaea dichotoma (Linn.) Smith.

Alt. 600 m., No. 10177.
Mindoro, Mindanao.
Madagascar to Polynesia.

LYGODIUM Swtz.

Lygodium flexuosum Swtz.

Alt. 300 m., No. 10090.
Throughout the Philippines, common.
China to Queensland.
Elmer's specimens are very hairy.

Lygodium circinnatum (Burm.) Swtz.

No. 9648. "Nito."
Common in the Philippines.
India to Queensland.
The rachises are much used in making hats, baskets, etc.

Lygodium japonicum (Thunb.) Sw.

Alt. 300 to 600 m., Nos. 10089, 9945. "Nito."
Common in the Philippines.
Japan to India and Australia.
Used like the preceding.

GLEICHENIACEÆ.

GLEICHENIA Smith.

Gleichenia linearis (Burm.) Clarke.

Alt. 1050 m., No. 10351.
Common throughout the Philippines.
Pantropic.

Elmer states that the stipes are almost 1 cm. thick at the base, and very rigid, the plant forming dense tangled patches.

Gleichenia gigantea Wall.

Alt. 1600 m., No. 9902.

India, China.

Sprawling over thickets in wet woods, and forming large, tangled masses on exposed ridges. Rachises green and very scaly; primary pinnae 60 cm. apart, 1 to 2 m. long. The segments are smaller and narrower than figured by *Hooker*, but it is typical in all other respects, and altogether like a specimen from Khasya.

Gleichenia hirta Bl.

Alt. 1550 m., No. 10084.

I beleive that this includes *G. dolosa Copel.* found in central Luzon, Mindoro, and Mindanao.

Malaya.

OSMUNDACEÆ.

OSMUNDA Linn.

Osmunda banksiaefolia (Presl) Kuhn.

Alt. 750 m. and upward, No. 10164.

Luzon, Mindanao.

Kamtchatka to China.

Caudex 15 cm. thick, 30 to 60 cm. high; fronds 2 m. high, beside the stipe; the lower pinnae fertile.

OPHIOGLOSSACEÆ.

OPHIOGLOSSUM Linn.

Ophioglossum pedunculosum Desv.

In mossy soil in woods, alt. 1400 m., No. 10207.

Luzon, Mindoro, Mindanao.

Japan to India and New Caledonia.

Ophioglossum pendulum Linn.

Alt. 1200 m., No. 9816. "Dagon."

Throughout the Philippines.

Mauritius to Hawaii.

BOTRYCHIUM Swtz.

Botrychium daucifolium Wall.

In rich soil, alt. 1200 m., No. 9710.

Mindanao.

India to Java.

MARATTIACEÆ.

MARATTIA Swtz.

Marattia sambucina Bl.

Alt. 1200 m., No. 9832. "Locdo-itum."

Luzon.

Malaya.

Small specimens, with almost no trunk and only 3 to 5 fronds.

The number of luculi in the synangium varies from 5 to 13.

ANGIOPTERIS Hoffm.

Angiopteris angustifolia Presl.

In moist woods, alt. 1200 m., No. 9833. "Locdo-bote."

The commonest Philippine species, from Luzon to Mindanao.

Formosa to Java.

Trunk 30 to 60 cm. thick and high, aerial roots thick and black, wiry. Stipe 1 to 3 m. long, and frond 3 to 6 m.

I have followed *Christ* in this identification not having access to the original description; but *Cuming's* collection includes another species with much narrower pinnules.

Angiopteris pruinosa Kze. (also determined after *Christ*).

On cliffs by waterfall, alt. 900 m., No. 10275.

Central Luzon to Negros and Panay.

Java.

Forked pinnules not uncommon.

LYCOPODIACEÆ.

LYCOPODIUM Linn.

Lycopodium squarrosum Forst.

Pendent, alt. 1050 m., No. 9639.

Throughout the Philippines, not common.

India to Polynesia.

Lycopodium cernuum Linn.

Subscandent in undergrowth of damp woods, alt. 1350 m., No. 10065.

Common throughout the Philippines.

Pantropic.

Lycopodium subscutaceum Christ ined.

On mossy trunks, alt. 1350 m., No. 10201.

Luzon.

Lycopodium pinifolium Bl.

On mossy trunks, No. 9528. "Talerunghai."

Luzon.

Malaya, New Guinea.

Lycopodium phlegmaria Linn.

Alt. 1300 m., No. 9498. "Damulmog."

Central Luzon to Mindanao.

Africa to Polynesia.

Lycopodium filiforme Roxb.

Pendent from trees, alt. 1300 m., No. 9499.

Central Luzon, Mindoro, Negros, Mindanao.

Monsoon region.

Lycopodium carinatum Desv.

Alt. 750 m., No. 10258.

Luzon, Mindanao.

Monsoon region.

The specimen is immature.

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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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SIX UNDESCRIBED SPECIES OF MACARANGA

BY

A. D. E. ELMER.

—o—

Macaranga caudatifolia Elm. n. sp.

Tree, 8 to 10 m. high; trunk 2 dm. thick; wood rather soft, easily cutting, reddish white, with a faint sappy odor; bark smooth, gray or mottled; branches suberect, the ultimate ones numerous, erect, comparatively short and forming a dense bushy crown; twigs glabrous, reddish when young. Leaves very numerous, membranous, characteristically descending, very smooth and dark green above, glaucous beneath, strongly conduplicate on the upper side, exceedingly variable in size but not in shape, the larger blades 8 cm. long, 3 cm. wide below the middle, glabrous on both sides, the lower surface densely covered with minute glands, margins entire toward the rounded or flatly cuneate or nearly subtruncate base and along the caudate apex, the sides obscurely undulate, the young foliage reddish; petiole averaging 1 to 2 cm. long, glabrous, reddish; nerves also reddish, conspicuous beneath, strict, oblique, 5 to 7 pairs, glabrous, the cross bars rather faint or obscure. Staminate inflorescence from the uppermost leaf axils, greatly varying in length from a few cm. to 1 dm., spicate; peduncle solitary from the leaf axils, glabrous, the longer ones occasionally short branched; flower clusters more numerously clustered toward the top, sessile, subtended

by bracts; bract 5 mm. long, lanceolate, 2 mm. wide toward the base, thick, yellowish pulverulent on both sides, upon a narrowed and flattened stalk, usually bearing 3 pairs of large circular glands upon the upper surface; flowers numerous in a dense cluster, short stipitate, each subtended by minute bracteoles; calyx nearly 1 mm. long; the 3 segments oblong to elliptic, obtuse to rounded, united at the base, deeply convex on the upper side; stamens 3, central, erect or ultimately spreading out between the calyx segments; filaments glabrous, 1 mm. long, somewhat flattened toward the base; anthers 0.5 mm. across, flattened, peltately attached, dehiscing from the apex into 4 false cells; pistillate flowers and fruits not seen.

Type specimen 9652, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

This species is very abundant and forms groves on a steep humid slope at 3500 feet elevation. Has only been seen in one place and does not extend much further down nor higher.

It is clearly allied to my *M. loheri*, but the leaves are more numerous, smaller, more uniformly caudate and characteristically white beneath. Number 9112 *Elmer* from Lucban was doubtfully distributed under *M. loheri Elm.* and may prove to be a young fruiting specimen of this species. The northern Luzon mountain form is *M. loheri Elm.* and is also known from the Batanes islands, while *M. caudatifolia Elm.* extends from middle Luzon southwards.

Macaranga cuneata Elm. n. sp.

Tree, 5 m. high; limbs spreading; wood whitish, soft; bark smooth and mottled; twigs tough, brown. Leaves descending, conduplicate on the upper side, tips recurved, shining green on the upper glabrous surface, paler to subglaucous and glandular beneath, alternatingly scattered along the ends of the twigs, subcoriaceous, broadly lanceolate, gradually tapering from below the middle to the acuminate or caudate apex, base cuneate, margins entire and slightly involute, the larger blades 12 cm. long by 5 cm. wide, quite variable in size; petiole 1 to 3 cm. long, at first dirty yellowish puberulent, ultimately becoming glabrous, slender, terete; nerves brown in the dry

state on both sides, pronounced and glabrous beneath, 5 to 7 pairs, very oblique, the basal pair provided with conspicuous lateral ones on the lower side, faintly united beneath the margin, cross bars and reticulations very obscure. Infrutescene erect or strongly ascending, straight, solitary from the leaf axils, reaching a length of 15 cm., dirty puberulent, unbranched, reddish, ultimately glabrous; male flowers not found; pistillate flowers in small alternating clusters which increase in numbers toward the apex, subtended by bracts; bracts 8 mm. long, 2 mm. wide toward the base, lanceolate, very thick, on the upper surface provided with 2 to 3 pairs of elongated glands, the base abruptly terminated into a short, flattened stalk; pedicels of fruits 1 to 2 cm. in length, strict, ascendingly spreading, very slender, glabrous, thickened toward the end; calyx deeply and narrowly cup-shaped, encasing the basal portion of the ovary, subglabrous, usually terminated by 2 to 3 comparatively thin and irregular lobes which in the fruiting state become widely spreading; ovary obovoid, 1-celled, 1-ovuled, densely light yellowish glandular or powdery (?), the 2 sides with small groups of circular excrescences or glands (?); sterile cell dwarfed and in the young stage sublaterally attached as a large blunt excrescence which becomes very much reduced or nearly obsolete in the fruiting state; fruits or capsules chiefly subglobose to short obovoid, often irregularly oblique, less than 5 mm. in diameter, glutinous, yellowish and spotted with wart-like reddish brown excrescences; nutlet solitary, ellipsoid, coal black, finely rugose, surrounded by a smooth brown shell.

Type specimen 9483, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

Rare in light woods in between hemp fields at 3000 feet elevation. In Visayan, "Belante."

Its affinities lie with *M. cumingii Muell. Arg.* and *M. loheri Elm.* However, it has not the leaves of the former, nor the leaves and pedicellate fruits of the latter.

Macaranga cuernosensis Elm. n. sp.

Tree, 10 to 15 m. high; trunk 6 dm. in diameter, branched above the middle; wood moderately soft, easily cutting,

tough in splitting, odorless, whitish except the reddish heartwood; branches slender, not rigid, widely spreading and forming an umbrella-shaped crown; bark gray to brown, thick, brittle, reddish beneath the skin. Leaves submembranous, descending, quite numerous toward the ends of the twigs, variable in size, glabrous on the upper side except the glandular dotted midrib, glabrous beneath except the sparsely pubescent nerves and more or less glandular, margins entire and involute, ovately oblong, base rounded or shortly obtuse, apex abruptly terminated into an acute point, the average blades 10 cm. long, one half as wide, curvingly condulplicate on the upper side and with recurved tips, sublucid on both sides, much paler green or yellowish so beneath; nerves 7 to 11 pairs, faintly united at their tips, prominent beneath and usually pulverulent, plainly visible from the upper side, the cross bars numerous and faint; petiole 3 to 5 cm. long, terete, ultimately glabrous; bud scales 5 mm. long, acute, brown, thick, subglabrous. Inflorescence along the twigs and occasionally from the lowermost leaf exils, panicled, not exceeding 5 cm. in length, branched from the base, the basal branches longest, pulverulent; bracteoles triangular, acute or obtuse, persistent; staminate flowers sessilly clustered along the branches, the clusters subtended by minute bracts; flowers short stipitate; calyx segments 4, oblong to elliptic, deeply concave on the upper side, 1 mm. long, united at the base; stamens centrally clustered, erect, 5 to 7 in number; filaments glabrous, longer ones 2 mm.; anthers 0.75 mm. across, peltately attached, dehiscing from the apex into 4 compartments; capsules globose, 1-seeded, 2 mm. in diameter, upon 2 to 4 mm. long pedicels, subtended by the 2 to 3-parted and persistent calyx segments, terminated by the persistent 2 to 3 mm. long solitary stigmatic arm, at first covered with a golden yellow powder which when rubbed off exposes the viscid surface.

Type specimen for fruit 9549, for male flower 10109, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March and May respectively, 1908.

This unique tree inhabits the dense woods at 3500 feet and extends to the very summit, although at the latter place it assumes a stunted tree form. Not common and called by the Visayan, "Belante-ihalas."

Macaranga sylvatica Elm. n. sp.

Tree, 10 to 15 m. high; trunk 5 dm. thick; wood rather soft, whitish except the reddish heartwood, odorless, easily cutting but hard to split; bark reddish beneath the brownish surface, smooth and grayish on the branches; branches above the middle, forming a round-topped crown; branchlets rather slender, not numerous. Leaves coriaceous, slightly conduplicate on the upper side and with recurved tips, shining dark green and glabrous above, much duller beneath, horizontally spreading, ovate, gradually tapering from below the middle to an acuminate point, the basal one third gradually tapering and subcuneate, margins subentire or obscurely undulate, the young leaves rusty or cinnamon brown on both sides, normal blades 1 cm. wide and 1.5 cm. long, glandular and brown tomentose beneath; stipule caducous, 1 to 1.5 cm. long, rigid, oblong to lanceolate, nearly 5 mm. wide, yellowish pulverulent on the outside, cinereous on the inner surface; petiole varying from 5 to 10 cm. long, yellowish brown tomentose at first, becoming glabrous and reddish, terete, stout; nerves 14 to 19 pairs, equally apart, rather strict, oblique, prominent beneath, conspicuously visible from the upper side, submarginally united, cross bars comparatively faint but numerous, more or less covered with flaky cinnamon brown scales which soon fall or rub off. Inflorescence axillary, exceeding the petioles but not the blades; peduncles solitary or 2 or 3 from the same axil, ascending, yellowish green, male sparingly branched, that of the female more numerously branched, puberulent, staminate flowers severally clustered upon short axillary receptacles which cluster is subtended by entire pulverulent bracts; individual flowers subtended by ciliated bracts, upon 1 mm. long puberulent pedicels; calyx segments usually 4, subrotund or elliptic, 1.5 mm. in length, deeply concave on the upper side, deep red; stamens about 10, centrally clustered; filaments paler, subglabrous, greenish in the dry state, subequal, 1 mm. long; anther 0.75 mm. across, basifixed, reddish before anthesis, splitting open from the apex into 4 divisions; pistillate flowers usually solitary from the subtending bracts, upon slender puberulent pedicels; calyx turbinate, surrounding one half of the ovary, short but densely

tomentose, mostly 4-toothed; obovate ovary glandular on the rounded apex; style none; stigma lobes 2, tapering from the base to the blunt apex, 3 mm. long, much flattened, pubescent on the lower side, bright red and provided with glandular papillae on the upper or stigmatic surface; capsules upon 3 to 10 mm. long pedicels, subglobose, slightly compressed, 5 mm. thick, subsessile, subtended by the persistent subentire or irregularly lobed and spreading perianth, densely glandular, bearing the persistent stigmas, 2-celled; nutlets brownish black, smooth, semispheric on the outer side, nearly plane on the ventral, about 3 mm. thick, attached along the vertical placenta.

Type specimen for male flowers 9838, for female flower 9824, and for fruits 10361, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April and June respectively, 1908.

This fine tree casts a uniform shade and inhabits the damp woods at 4000 feet. Not common nor varying much in altitude.

Macaranga loheri Elm. n. sp.

Tree, 6 m. high; main branches from the middle, the branchlets ascending, the ultimate ones glabrous and slender; wood white, soft, covered with mottled grayish white and smooth bark. Leaves dull green, divaricate, ventrally conduplicate, numerous, ovate, with slenderly acuminate apex, base rounded or obtuse, about 15 cm. long, only one third as wide below the middle, glabrous on both sides but resiniferously glandular beneath, subcoriaceous, margins entire or obscurely undulate above the middle, deciduous, leaving broad obovate scars; petioles about 5 cm. long, glabrous, reddish; nerves ascending, 5 to 7 on each side, the cross bars obscure, without glands at the base on the upper leaf surface. Staminate inflorescence axillary, asceding, 5 to 13 cm. long, glabrous, sparingly branched, the younger portions glutinous; the dense sessile flower clusters irregular in size, 3 to 5 mm. in diameter, usually subtended by a single much exceeding glabrous bract; perianth 2-segmented, yellowish, glabrous, the segment 1 mm. long and broadly obovate; stamens 3; the pulverulent filaments 1 mm. long,

gradually thickened toward the base; anthers light yellow, 4-lobed, peltately attached, 0.5 mm. across; pistillate flowers not seen.

Type specimen 8558, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

In limestone basins of the pine region at 5000 feet. It is called "Anitab" by the Igorrotes. Named after *Mr. A. Loher*, who has made a splendid collection of Philippine plants and discovered many novelties.

Evidently it is very closely related to *M. cumingii Muell. Arg.* based on *Cuming's* number 1100 which has a pair of large glands at the base of the leaf on the upper side; flowers much smaller and inflorescence finer. It can further be distinguished by the conspicuous bracts subtending the staminate clusters. Staminate specimen number 9197 *Elmer* from Lucban, May, 1907, was distributed under *M. loheri Elm.*, but which, excepting the basal pair of glands, is a close match to 1100 of *Cuming's* collection. Doubtless the pistillate flowers and mature fruits will reveal other distinctive characters.

Macaranga ramiflora Elm. n. sp.

Widely spreading tree, soon dividing into thick main branches; wood white and soft, covered with smoothish mottled bark, the bark on the twigs reddish brown. Leaves spreading, subcoriaceous, deep green and shining above, yellowish green and glandular punctate beneath, drying dark brown, alternatingly scattered along the twigs, flat or with slightly recurved tips, ovately to elliptically lanceolate, apex sharply acuminate, subcuneately rounded toward the base, unequal in size, with the entire margins subinvolute, the medium sized blade 14 cm. long and 6 cm. across the middle, mostly with a pair of glands at the base on the upper side; petiole 3 to 5 cm. long, glabrous when mature, brown, the upper grooved side usually transversely cracked; nerves beneath maroon color, 9 to 12 on each side, ascending, parallel, obscurely united, the straight cross bars numerous but rather faint. Infrutescence scattered along the leaf bearing portion of the twigs, shorter than the petioles, in the leaf axils or in the axils of the leaf scars, paniculate, 3 to 5 cm. long, from 1 to 3-clusters in the

same axils, subglabrous or when young dirty yellowish pubescent, very sparingly branched; pedicels from 1 to 3 mm. long, subtended by short acute bracts, asually short yellowish pubescent; calyx persistent, reflexed with age, united toward the base, 3-lobed, the segments triangularly obtuse and about 1 mm. in length, resinous glandular, ovary glandular, when mature more or less covered with resin colored granules; style arms 2, cleft clear to the base, rather thick, brown, 4 mm. long, subcompressed and with minute excrescences; capsule 2-celled, laterally subcompressed, obovoid or subglobose, 4 mm. thick; seeds solitary in each cell, ventrally attached to the septum, plano-convex, smooth, shining black, 2 to 3 mm. in diameter, confluent and subpersisting even after the carpels have become detached; staminate flowers not seen.

Type specimen 8108, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

Only one tree was observed in woods near a precipice at 3000 feet on Mount Banahao.

Very similar to *M. javanica Muell. Arg.*, but our specimen is more glabrous, base of foliage without the incurved margins, panicles much shorter and more numerously branched, and with much smaller floral bracts; the capsules are also larger and confluent, containing larger shining black seeds which are plano-convex rather than globose.

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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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LICHENES PHILIPPINENSES

AUCTORE

A. ZAHLBRUCKNER.

(Leit. Bot. Abth., K. K. Naturhistorishen Hofmuseums, Wien)

—o—

Cladonia Floerkeana var. **carcosta (Ach.) Nyl.**

Baguio, Benguet Prov., Luzon, ad terram (*Elmer* No. 8454).

Stereocaulon nesacum Nyl.

Baguio, Benguet Prov., Luzon (*Elmer* No. 8606).

Leptogium javanicum Mont.

Lucban, Tayabas Prov., Luzon, c. 600 m., ad ramulos Ficorum, fructifera (*Elmer* No. 9270 fr. p.).

Leptogium moluccanum (Pers.) Wainio.

Lucban, Tayabas Prov., Luzon, c. 600 m., ad ramulos Ficorum, fructifera (*Elmer* No. 9270 fr. p.).

Leptogium tremellioides Wainio.

Lucban, Tayabas Prov., Luzon (*Elmer* No. 7413).

Coceocarpia molybdaea (Pers.).

Baguio, Benguet Prov., Luzon, corticola (*Elmer* No. 8705).

Lobaria pulmonaria (L. f.) isidiosa A. Zahl.

Baguio, Benguet Prov., Luzon, corticola, fructifera (*Elmer* Nos. 8335, 8993).

Lobaria Schaereri (Montg. et. v. d. Bosch.) A. Zahl.

Baguio, Benguet Prov., Luzon, corticola, fructifera (*Elmer* Nos. 8992, 8698).

Tanneria mariana Müll.-Arg.

Lucban, Tayabas Prov., Luzon (*Elmer* No. 7400).

Peltigera polydactyla var. **microcarpa Ach.**

Baguio, Benguet Prov., Luzon, ad terram, fructifera (*Elmer* No. 8456).

Parmelia Nilgherrensis Nyl.

Baguio, Benguet Prov., Luzon, corticola, fructifera (*Elmer* No. 8563.)

Parmelia latissima Tec.

Palo, Leyte Prov., (*Elmer* No. 7227).

Usnea florida (L.) Hue.

Baguio, Benguet Prov., Luzon, corticola, fructifera (*Elmer* No. 8373).

Anaptychia leucomelaena (L.) Wainio.

Baguio, Benguet Prov., Luzon, inter muscos et lichenes fructifera (*Elmer* No. 8797).

Anaptychia hypoleuca Wainio.

Lucban, Tayabas Prov., Luzon (*Elmer* No. 7401).

Physcia picta Nyl.

Palo, Leyte Prov., Leyte (*Elmer* No. 7203).

Sticta quercifolia Tayl. (?)

Baguio, Benguet Prov., Luzon (*Elmer* No. 8350).

Sticta dissimulata Nyl.

Lucban, Tayabas Prov., Luzon (*Elmer* No. 7656).

Sticta clathrata DNotro.

Baguio, Benguet Prov., Luzon, corticola, fructifera (*Elmer* No. 8991).

Sticta caperata var. **javanica Nyl.**

Baguio, Benguet Prov., Luzon, corticola (*Elmer* Nos. 8659, 8660).

Sticta (Stictina) tomentosa Ach.

Baguio, Benguet Prov., Luzon, corticola, fructifera (*Elmer* No. 8545).

Sticta (Stictina) Elmeri A. Zahl. nov. spec.

Thallus erectus, usque 7 cm. altus, subcoriaceus, 0.2 -0.25 mm. crassus, stipitatus, stipite brevi, 4-5 mm. alto, superne subcanaliculato, obscure fusco, opaco, tomentello, in gomphum latum basi abeunte, lamina iteratim dichotome vel subdichotome lanciniata, laciniis sat elongatis, usque 4 cm. longis et 4-9 mm. latis, suberectis vel plus minus patentibus, axillis rotundatis, planis, sublinearibus, ad apices rotundatis vel emarginatis, ad margines subintegris et ibidem passim tomento breviusculo, denso, fusco-nigricante ornatis, caeterum sorediis et isidiis destitutis, superne glaucescenti-cinerascentibus vel subochraceo-glaucescentibus, subnitidis, KHO-, Ca Cl_2O_2-, laevigatis, subtus margines versus plus minus nudis et pallide ochraceis, caeterum tomento sat brevi densoque, umbrino-fusco vestitis, cyphellis veris munitis pallidis, parvis (ad 0.2 mm. latis), subsemiglobosis, poro fere punctiformi, utrinque corticatis, cortice superiore 18-26 μ alto, decolore, pseudoparenchymatico, cellulis ei seriebus superpositis 3-4, subangulosis, 5-18 μ latis, leptodermaticis; cortice infero cortici superiori simili sed paulum angustiore; medulla alba, KHO-, Ca Cl_2O_2-, KHO + Ca Cl_2O_2-, ex hyphis dense contextis, utplurimum plus minus horizontalibus, leptodermaticis, increbre septatis, 3-6 μ crassis formata; gonidiis nostocaceis, violaceis, infra corticem superiorem sitis, stratum angustum for-

mantibus, cellulis oblongo-ovalibus, 3.5-4 μ longis, rhizinis ex hyphis fasciculatis, fuscis, sat dense septatis formatis, cellulis cylindricis, ad septa non constrictis, membrana mediocris cinctis.

Apothecia et marginalia et superficialia, parva, usque 2 mm. lata, subsessilia, basi constricta, plana; disco testaceo, alutaceo vel obscurato, opaco, epruinoso; margine proprio pallido, tenui, paulum prominulo, subintegro; exipulo pseudoparenchymatico, ex hyphis radiantibus et septatis formato, cellulis sat leptodermaticis, ad marginem eroso-inaequali, gonidia non includente; hypothecio pallido, ex hyphis dense intricatis formato; hymenio dilute lutescente, 110-122 μ alto, prima obscure coeruleo, demum rufescente obscurato, striato angusto supremo tamen solum lutescente; paraphysibus simplicibus, eseptatis, ad apices haud latioribus, ad 2 μ latis, gelatinam firmiusculam percurrentibus; ascis anguste oblongoclavatis, hymenio paulum brevioribus, 8 sporis; sporis in ascis subbiserialibus, fere decoloribus, fusiformi-oblongis vel oblongis, rectis vel subrectis, apicibus acutatis, 1-3 septatis, 24-30 μ longis et 7.5-8.5 μ latis, membrana tenui cinctis, septis tenuibus.

Luzon, Lucban, Tayabas Prov., c. 700 m.s.m., ad truncos et ramos Ficorum (*Elmer* No. 9269).

Ad *Stictam filicinam Ach.* et ad *Stictam ciliarem Montg.* accedit, sed ab ambabus differt laciniis thalli sublinearibus et cyphellis parvis semiglobosisque.

THE ESCOLTA PRESS, INC.

LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

Vol. II. Manila, P. I., November 7, 1908. Art. 22.

SIX NEW MYRSINACEAE

BY

A. D. E. ELMER.

—o—

Ardisia punctata Elm. n. sp.

Shrub, 3 m. high; branches divaricate, crowded toward the top of the stem. Leaves flat, submembranous, similarly green and punctate on both sides, elliptic, glabrous, averaging 1 dm. long, 5 cm. wide across the middle, the entire margins minutely involute, at least in the dry state, ends equally acute; petiole stout, caniculate on the upper side, glabrous, from 5 to 10 mm. long; midnerve prominent, the lateral ones divaricate, rather fine, visible from both sides, the larger ones frequently alternating with smaller ones, approximately 13 pairs, united a few mm. below the margin, the reticulations quite evident from both sides. Inflorescence mostly terminal, paniculate, at most 1 dm. long, the divaricate branches chiefly above the middle, glabrous; pedicels thickened toward the distal end, glandular in the young state, from 7 to 10 mm. long; calyx segments 5, united at the base, glabrous, glandularly dotted, rigid and persistent, margins obscurely fimbriate, triangularly acute, nearly 1.5 mm. long; petals 4 mm. long, pale white or pinkish, imbricate and in the bud state distinctly twisted, falsely united at the very base, glabrous, glandular, the back ridged, the apex sharply

acuminate and with involute margins; anthers 5, opposite the petals and inserted upon their bases, bilobed at the base, triangularly elongated, about 3 mm. long, apiculate, sublaterally dehiscing from the apex toward the base, the entire anther snugly encased by the petal; pistil glabrous; ovary conical, entirely superior; style 3 mm. long, terminated by a minute terminal stigma; fruits 1-seeded, striate, subglobose, with ends equally compressed, 6 mm. thick.

Type specimen 10151, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908; Number 10385 with fruits, collected in June of the same year and in the same locality.

A sparingly branched undershrub, in mossy, humid woods at 4250 feet.

Separated from *A. mezii Elm.* by the differently nerved leaves which, instead of being finely glandular beneath, are punctate. The flowers and fruits also serve as distinguishing characters.

Ardisia mezii Elm. n. sp.

A shrub, 3 m. high; bark brown, wood breaking with a snap. Leaves scattered along the twigs, chartaceous, lanceolate to oblanceolate but usually oblong, shining dark green above, much paler beneath, edges subinvolute and entire, apex acute but frequently only obtuse, base cuneate or attenuate, the normal blade 15 cm. long, 5.5 cm. wide across the middle, but the smallest ones much less, flat, the midvein very prominent beneath, caniculate on the upper surface, the lateral ones rather numerous but obscure; petiole about 2 cm. long, deeply caniculate along the upper side, glabrous. Inflorescence dark brick red, glabrous, terminal or subterminal, 5 to 10 cm. long, composed of several rather rigid racemose spikes; flowers 5-merous, similarly colored, pendulous, usually more numerous toward the ends of the rachis and rachilla; pedicels easily detached, leaving annular scars, 4 mm. long, 1 mm. wide toward the apex, glabrous; calyx segments at most 2 mm. long, the lower one third united, ovately oblong, the thin margins finely fringed; corolla segments barely united, easily detached as a whole, 3 mm.

long, ovately acuminate, glabrous; stamens 5, opposite the petals and inserted upon the inner base, upon a glabrous 0.5 mm. long filament; anther triangularly oblong, 2 mm. long, 1 mm. wide, base truncate, apex apiculate, dehiscing by sublateral longitudinal slits; style 3 mm. long, straight, glabrous; its terminal stigma slightly enlarged; ovary also glabrous, ovoid or ellipsoid; berry globose, 5 mm. in diameter.

Type specimen 7887, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

An undershrub of dense woods skirting the base of Mount Banahao at 2400 feet. Dedicated to *Dr. Carl Mez.*

Similar to *A. elmeri Mez*, but leaves less reticulate, inflorescence differently branched and petals rounder. A fruiting specimen has been collected in October, 1904, in the same locality by *Dr. H. N. Whitford*, number 936. The fruits on this specimen are globose, 5 mm. in diameter, bearing an apiculate persistent style, glabrous, not striate nor spotted.

Discocalyx linearifolia Elm. n. sp.

Low unbranched erect or suberect shrub, 2 to 3 m. high; stems near the top 1 cm. thick, with reddish wood and large pith. Leaves crowded toward the top only, linear, 3 to 5 dm. long, 2 to 3 cm. wide, broadest above the middle, edges entire, chartaceous, the lower one half gradually attenuate to the very short and thick petiole, toward the apex sharply acuminate, glabrous; lateral nerves venosely radiating from the very stout midvein which is strongly caniculate on the upper surface, the upper blades ascending, the lower ones radially spreading. Inflorescence in between the foliage but not from the leaf axils, ascending; peduncles bracteate, usually strict, subterete, varying from 1 to 3 dm. long, glabrous, 1 to 2 mm. thick, subtended at the base by 2 to 5 cm. long acuminate bracts; foliaceous bracts ascending, scattered, usually above the middle but chiefly near the top, narrowly lanceolate and acuminate, the larger ones 1 cm. wide and 6 cm. long; secondary peduncles from 3 to 5-clustered at the slightly thickened distal end of the primary peduncle, each subtended by 2 sharply acuminate bracts, otherwise ebracteolate, smooth, very slender, diverse in length, from 7 to 17 cm. long;

pedicels 1 to 1.5 cm. long, thin and slender, deciduous, few and scattering along the secondary peduncles; flowers dull red, 5-merous; calyx barely united at the base, punctate, the segments 1.5 mm. long, 0.5 mm. wide, oblong or nearly strap like, the apex abruptly contracted into a fine point; corolla also punctate, 2.5 mm. long, subrotund to elliptic, glabrous, rotately spreading, nearly free; stamens about 10, sessile; anthers 0.5 mm. long, one half as wide, both ends subtruncate, inserted upon the base of the corolla segments.

Type specimen 7674, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

An undershrub of woods in fertile half swampy ground. Rare and only known from Mount Banahao.

Distinct from its nearest relative *D. angustifolia Mez.*

Discocalyx psychotrioides Elm. n. sp.

Shrub, 4 m. high; branches divaricate, quite crooked and rigid, covered with smooth yellowish gray bark. Leaves flat, chartaceous, spreading and clustered from the tips of the twigs, obovate, entire or only obscurely denticulate toward the apex, early falling, leaving broad conspicuous scars, much lighter green beneath, above glabrous and prominently punctate, the apex short acute, base cuneate, the medium sized blades 14 cm. long, 6 cm. wide above the middle, beneath short rufous brown pubescent especially along the nerves and conspicuously punctate; petiole at most 2 cm. long, with a dense rusty brown tomentum on the younger ones, gradually thickened toward the base; nerves dark brown in the dry state; the lateral ones oblique, subparallel, from 5 to 8 on each side, those near the base inconspicuous; bud scales 1 cm. long, covered with a similar tomentum. Infrutescence a cluster of 3 to 5 racemose spikes, from the leaf axils or terminal upon short leafless twigs; rachis usually somewhat compressed, 4 to 7 cm. long, radially spreading, densely rusty brown pubescent; fruit upon 1 to 2 mm. long brown pubescent pedicels, smooth, yellowish, early falling and leaving conspicuous scars, globose, 7 mm. in diameter, 1-seeded; style of fruit very short, bearing a rim like capitate stigma; persistent calyx united at the base; the middle portion of the 5 seg-

ments brown pulverulent, margins thin and lighter brown, about 1 mm. long, obtuse, ovately triangular; flowers not seen.

Type specimen 9097, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

Only one plant was seen on a dry wooded ridge on Mount Banahao at 2750 feet. Strongly resembling certain species of *Psychotria*.

Not having flowering specimens there still remains some doubt as to its rightful genus.

Discocalyx montana Elm. n. sp.

Erect, sparingly branched shrub, about 4 m. high; bark grayish; wood soft with a large brown pith. Leaves rigid, clustered at the ends of the thick branchlets, ascending, strongly conduplicate on the ventral side, deciduous, leaving large scars, mostly oblanceolate, the average blade 2 dm. long by 6 cm. wide, apex acute, base slenderly attenuate, glabrous, margins above the middle usually apiculate to finely dentate; petiole 4 to 7 cm. long, rather rigid, glabrous, caniculate on the upper side; nerves pinnate, 14 to 19 main pairs with as many secondary pairs, ascending, prominent beneath, especially the midrib, reticulations fine and also conspicuous beneath. Infrutescence ascending, from the lower leaf axils, always shorter than the foliage; main peduncle variable in length, rigid, more or less flattened; secondary peduncles subtended by deciduous foliaceous bracts, radially spreading, 4 to 7 cm. long, glabrous, reddish; pedicels divaricate, of the same color, 3 to 5 mm. long, bearing from 1 to 3 berries; persistent calyx united at the base, 4 mm. across, roundly 5-segmented; berries light red, soon turning wine color, rather smooth, 5 mm. in diameter or larger when fully grown, globose.

Type specimen 8816, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

Not rare but only observed in shrubberies of the limestone regions. It is quite variable. More recently it has been collected on Mount Banahao where it is rare, and also on Mindoro.

Major E. A. Mearns collected this same species in flower in Benguet province, Luzon, July, 1907 (Forestry Bureau record 3490). In these flowers the 5 sepals and 5 petals are glabrous

and glandular, elliptic; the former are united below the middle; the latter are also united toward the base, only imbricate, not twisted in the bud, slightly exceeding the sepals; stamens 5, sessilly inserted upon the base of the corolla, opposite the petals, subtruncate, angular; style 1 mm. long, terminated by a comparatively large umbrella shaped stigma. Different from *D. effusa Mez*, a very close ally.

Maesa embelioides Elm. n. sp.

Lax, and a half creeping shrub; stems and branches tough, brown, numerously covered with lighter colored lenticels. Leaves scattered along the twigs, alternate, submembranous to subcoriaceous, broadly lanceolate to oblong, the average blade 15 cm. long and about one half as wide across the middle, flat, apex acute or mostly acuminate, base acute, glabrous, paler green beneath, the upper side dull dark green, margins obscurely undulate and distantly apiculate or subentire especially toward the base; nerves prominent beneath, usually 3 to 5 on each side, ascendingly curved, sparsely branched near their ends, reticulations not evident; petiole glabrous, slender, 2 cm. long. Inflorescence spicate, 1 to 3-clustered, ascending, about 3 cm. long or shorter, glabrous; pedicels divaricate, subtended by small persistent bracts, 3 to 5 mm. long, ultimately subrecurved; calyx 1.5 mm. long, the 5 rounded segments united below the middle, usually subtended by a few minute bracts; corolla only slightly exceeding the calyx, glabrous, yellowish white, the 5 rounded lobes 0.5 mm. long; stamens 5, opposite the corolla segments and inserted at about the middle; filaments very short, glabrous; anthers 0.3 mm. long or as long as the filaments, oblong or ovate, glabrous; ovary one half imbedded; style also glabrous, 0.5 mm. long, thick, terminating into 5 very short thick lobes; fruits 4 mm. long, a trifle less in diameter, smooth, ellipsoid, more pointed toward the apex, and usually bearing the withered persistent calyx; seeds angular, brown.

Type specimen 7459, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906.

Along streamlets of deeply shaded canyons near cliffs at 2500 feet on Mount Banahao.

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LEAFLETS OF PHILIPPINE BOTANY

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SYNOPSIS OF RUBUS

BY

A. D. E. ELMER.

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RUBUS Linn.

Creeping herbs, erect shurbs or powerful climbers almost always prickly. Leaves simple or compound, alternate; stipules adnate or free from the petiole. Flowers in terminal or axillary corymbose panicles, rarely solitary, with red or white petals; calyx tube broad cup-shaped, united below the middle; lobes 5, persistent, petals 5, usually deciduous; stamens many; disk lining the calyx cup; carpels many, on a concave glabrous or villous receptacle; sytle subterminal; ovules 2, pendulous; drupes many, 1-seeded, crowded upon a dry or spongy conical or cylindric receptacle.

About 200 species, abundant in the northern hemisphere, extending into the tropics on the higher mountains. Out of the 16 species and 1 variety enumerated from the Philippines, 9 species including the variety are endemic. Just about one half of the total number occur in the province of Benguet, Luzon only. A good percentage of them indicate a strong relationship to those found on the high table lands of temperate Himalaya. Such species as *R. ellipticus Sm.*, *R. lasiocarpus Sm.* and *R. rugosa Sm.* are endemic to the Himalayan region and in our Archipelago they are locally confined to the well drained grass lands of shallow ravines along streamlets of the pine region of mountainous northern Luzon.

Key to the Philippine species of *Rubus*.

Leaves simple.
 Herbaceous creeper.
 1. *R. pectinellus.*
 Branched shrubs.
  Leaves without distinct lobulations.
   Leaves strigose beneath; petals none or very minute; twigs tomentose, provided with tack shaped glandular hairs.
   2. *R. mearnsii.*
   Leaves glabrous or only the nerves beneath strigose; twigs not tomentose, without glandular hairs.
    Petals none; calyx densely tomentose; stipule entire; stamens and pistils 3 mm. long.
    3. *R. benguetensis.*
    Petals present; calyx cinereous; stipule pectinately lobed; stamens and pistils 6 mm. long.
    4. *R. brevipetalus.*
   Leaves tomentose beneath; petals present, comparatively large.
    Leaves pubescent above; stipules toothed or laciniate.
    5. *R. zambalensis.*
    Leaves glabrous above; stipules entire.
    6. *R. luzoniensis.*
  Leaves more or less with distinct lobulations.
   Berry red; powerful climber; leaves submembranous; flowers less than 2 cm. broad with calyx not exceeding 12 mm. in length.
   7. *R. moluccanus.*
   Berry red; rambling shrub; leaves coriaceous; flowers 3 cm. broad and with a 2 cm. long calyx.

8. *R. rolfei.*

Berry yellow; a low rigid shrub; leaves coriaceous; flowers 2.5 cm. broad with calyx at most 15 mm. long.

9. *R. rugosus.*

Leaves trifoliate.

Leaflets canescent beneath; twigs tomentose and densely beset with reddish bristles.

10. *R. ellipticus.*

Leaflets subglabrous beneath; twigs glabrous or puberulous, without the characteristic bristles.

Exterior of calyx provided with gland-terminated hairs; stipules large, foliaceous.

11. *R. copelandi.*

Exterior of calyx tomentulose; stipules small, linear.

12. *R. clementis.*

Leaves pinnate.

Twigs and under surface of leaves glaucous white.

13. *R. lasiocarpus.*

Twigs and lower leaf surface not glaucous white.

Leaves coriaceous and glabrous, with rather numerous nerves which are very prominent beneath; a large numerously branched and spreading shrub, with large paniculate and subpendulous panicles.

Twigs glabrous and spiny.

14. *R. fraxinifolius.*

Twigs glandular and spiny.

15. *R. fraxinifolius haightii.*

Leaves membranous and usually pubescent, with fewer and less conspicuous nerves; low shrubs with ascending few-flowered inflorescences.

Dwarfed shrub up to 1 m. in height; leaflets comparatively small, rounded; twigs, leaves, and inflorescence usually without glands.

16. *R. tagallus.*

A suberect or reclining or even subscandent shrub, 1 to 2 m. high; leaflets larger, lanceolate and acuminate; twigs, leaves, and inflorescence glandular.

17. *R. rosaefolius.*

1. **Rubus pectinellus Maxim.** in Bull. Acad. Petersb. 17; 147, 1871.

A creeping perennial herb, taking roots from the joints, more or less villous throughout and provided with sharp recurved hooks. Leaves scattered, membranous, dark green on the upper surface, flat, horizontal, cordately rotund or occasionally obscurely 3-lobed, with finely dentate margins, both surfaces covered with long villous hairs, 2 to 5 cm. across, the 3 to 5 primary nerves prominent beneath and provided with spines, the reticulations numerous and quite conspicuous; petiole varying from 2 to 5 cm. in length, villous, the under side provided with spines; stipules always laciniately dissected, 1 cm. long or less, soft membranous and villous, broadly oblong in outline. Inflorescence axillary or terminal, mostly 1-flowered but sometimes as many as 3; pedicel 1 to 3 cm. long, villous and spinescent, usually provided with a stipular bract; calyx cup-shaped, the 5 lobes united below the middle, prickly toward the base, more or less villous, pectinately or laciniately margined, broadly ovate to oblong, apex elongated, acuminate, 10 to 15 mm. long, less than 9 mm. wide, thin; petals 5, white, deciduous, ovately obtuse to oblong and rounded, base broadly rounded and terminated by a very short claw, 10 mm. long, 8 mm. wide below the base; stamens many, 5 mm. long, unequal in length; filaments glabrous, somewhat flattened, inserted with the petals upon the throat of the calyx; anthers basifixed, cordate apex occasionally bifid, 1 mm. long; styles nearly as long as the filaments, subglabrous, bearing a small capitate stigma: berry deep red, flattened and with comparatively few achenes.

This Japanese species inhabits the high mountains of the Philippines, and is very similar to *R. calycinus Wall.* from which the stipules distinguish it. Said also to have affinities to *R. buergeri Miq.*, a woody species.

2. **Rubus mearnsii Elm. n. sp.**

Apparently a sprawling or subscandent shrub; twigs terete, provided with rather small prickles, densely olivaceous tomentose and with slender reddish hairs terminated by glands. Leaves simple, alternatingly scattered, ovate, finely dentate,

submembranous, cordate at base, apex short obtuse to rounded, strigosely pubescent on both sides, densely so along the nerves above, those on the upper side olivaceous, those beneath whitish, the blades 8 cm. long by 6 cm. wide across the middle; nerves 7 to 9 pairs, 2 to 3 pairs arising from the base, oblique, straight, pronounced beneath, the larger ones spinescent, depressed above, cross bars also conspicuous beneath; petiole stout, 1 to 2 cm. long, glandular pubescent and spinescent as on the twigs; stipule oblong, 1 cm. long, 3 to 4 mm. wide, pubescent on the outside, subglabrous on the inner, pectinately toothed or fringed. Panicle elongated, terminal, 3 dm. long, subpendulous; peduncles secondary peduncles, pedicels, and calyx olivaceous tomentose, bristly glandular, and the former more or less provided with spinules; ultimate peduncles and pedicels about 1 cm. long, subtended by fimbriate bracteoles; calyx united only at the very base, 1 cm. long, lanose pubescent on both sides above the middle, on the exterior about the base provided with some reddish bristles-bearing glands, glabrous and dark purplish brown on the interior at the base; the 5 lobes unequal in width, the broader ones usually pectinate toward the apex; petals not known; stamens numerous, in a single series and inserted upon the calyx throat; filaments filiform, glabrous, apparently also purplish brown toward the base, 7 mm. long; anthers broadly ellipsoid, 0.5 mm. long, versatile; pistils equalling the stamens, also glabrous; style purplish (?), bearing minute stigmas; receptacle ciliate pubescent; berry unknown.

Type specimen collected by *Maj. E. A. Mearns*, Pauai near *Mr Haights'* place, Province of Benguet, Luzon, July, 1907. (Bureau of Science record 4304).

Intermediate between *R. luzoniensis Merr.* and *R. benguetensis Elm.* Distinguished from the former by the strigose leaves, the absence of the petals and the glandular twigs; from the latter by both the strigose leaves and glandular twigs.

3. **Rubus benguetensis Elm.** Leaf. Philip. Bot. 1; 296, 1908.

Sprawling or subscandent; stems quite rigid and numerously provided with sharp prickles; branches brown, pubes-

MO. BOT. GARDEN

cent, also prickly. Leaves scattered along the branchlets, flat, rigidly spreading, ovate, 10 cm. long, one half as wide toward the base, frequently smaller, glabrous except along the nerves, apex obtuse or acute, base shallowly cordate, margin finely serrate; nerves 5 to 7 on each side, much ascending, the midrib usually prickly; petiole about 2 cm. long, prickly and yellowish brown pubescent; stipules 1 cm. long, lanceolate, densely pubescent on the outer side, edges usually rolled in over the subglabrous ventral side. Paniculate inflorescence terminating the branchlets, 1 to 2 dm. long, one half as much across; branches divaricate, pubescent, the larger ones prickly; pedicels as well as the branchlets subtended by bracts, about 5 mm. long, densely covered with a yellowish gray tomentum, flexuose; calyx 12 mm. long, tomentose on the outer side, united at the base, the 5 segments slightly unequal in width, sharply acuminate, rather thick and nerved; flowers usually 3-clustered, apetalous; stamens numerous, 6 mm. long, inserted upon the calyx rim; filaments glabrous, straight, subequal, sharply pointed; anthers 0.75 mm. long, nearly as wide, basifixed; carpels glabrous subtended by numerous light yellow hairs; styles also glabrous, 4 mm. long, the stigmatic apex only slightly thickened; berries flat, few seeded, shining, nearly black.

It is rather common in the limestone formation of the pine region about Baguio, and is, besides the previous one, the only apetalous species known from the Philippines. The Igorrotes call it Kobat. Only known from the type locality.

4. **Rubus brevipetalus Elm.** n. sp.

A lofty tree climber; stems rigid, numerously branched and forming large tangled bushes; branchlets green, with a few blunt spines; twigs glabrous or minutely puberulent, more numerously provided with short flattened recurved spines. Leaves thick and rigid, alternatingly scattered along the branchlets, dark lucid green above, much lighter or yellowish green beneath, curvingly condulplicate on the dorsal side, with slightly recurved tips, quite variable in size, the smaller ones elliptic, the larger ones ovately oblong, 10 cm. long by 5 cm. wide, glabrous on the upper surface except along the sunken midvein; margins subentire toward the rounded base,

otherwise crenately toothed, abruptly terminated into an acute or obtuse point; petiole 12 mm. long, stout, strigose with yellowish hairs, spinulose along the under surface, caniculate on the upper; midvein very pronounced beneath and also spinulose, the lateral 5 to 7 pairs ascendingly curved and united, reddish brown, reticulations rather plain, all more or less strigose with yellowish hairs; stipule 8 mm. in length, short yellowish pubescent, along the outer side linearly divided into 3 to 5 filiform segments. Corymbose panicles terminal or from the uppermost leaf axils, puberulent, 1 to 2 dm. long, equally as wide; secondary peduncles and pedicels divaricate, subtended by laciniately cleft bracteoles; pedicels slender, 10 mm. long, short pubescent; calyx 8 mm. long, truncate at the base, the 5 segments divided nearly to the base, thick short cinereous on the outside and upper portion of the ventral side, gradually tapering to a fine acuminate point, strongly reflexed when mature; stamens very numerous, with the petals inserted upon the calyx rim; filaments glabrous, filiform, 5 mm. long, interlaced; anthers basifixed, oval, 0.5 mm. long, 0.75 mm. wide; petals 5, white, linear oblong, 3 mm. long by 1 mm. wide, somewhat narrowed toward the base, apex oblique or bluntly and irregularly toothed; pistils comparatively few, arising from a flattened villous receptacle, strict, 8 mm. long; ovules sparsely ciliate; style glabrous, slender, terminated by a small capitate stigma, exceeding the stamens; berry unknown.

Type specimen 10099, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

A powerful climber in dense wooded jungles at 3000 feet elevation. Rare, and chiefly in inaccessible places.

Very close to my *R. benguetensis*, but the calyx is not densely tomentose, stamens and pistils twice as long, petals present, stipules not entire, and inflorescence more corymbosely paniculate.

5. **Rubus zambalensis Elm. n. sp.**

Branched shrub; branchlets densely tomentose, provided with comparatively small retrorse spines. Leaves alternate, numerous, rigid, simple, 3 to 4 cm. wide, 5 to 7 cm. long, ovate to oblongish, apex rounded or short obtuse, base cor-

date, margins serrately dentate, yellowish tomentose beneath, with olivaceous strigose hairs on the upper side or becoming subglabrous; petioles stout, 1 cm. long, densely covered with olivaceous pubescence, usually provided with a few spicules along the under side; nerves very prominent beneath, strict, oblique, depressed on the upper surface, 6 to 9 pairs, anastomosing but not submarginally united; stipules about 1 cm. long, laciniately toothed, oblong, 5 mm. wide, pubescent but more so on the outside. Young inflorescence terminal; buds more or less in small glomerules subtended by stipular bracts, short pediceled, conical, 8 mm. long, 6 mm. wide across the base; calyx segment 8 mm. long, ovately or triangularly oblong, united toward tbs base, wooly on both sides, entire, subtended by an involucre of 4 segments; these segments average 10 mm. long, are ovately acute in outline, densely tomentose on both sides, provided with callous blunt teeth; petals not known; stamens numerous, inserted upon the calyx rim, glabrous, 2 mm. long, bearing versatile 0.75 mm. long ellipsoid anthers; pistils equalling the stamens, also glabrous, bearing minute stigmas; receptacles hairy; berry not known.

Type specimen collected by *Messrs. H. M. Curran* and *M. L. Merritt*, Mount Tapulao, Province of Zambales, Luzon, November to December, 1907. (Forestry Bureau record 8085).

This very remarkable species is said to have blue (purplis ?) flowers, the buds of which are subtended by a 4-lobed involucre. Approaches *R. luzoniensis Merr.*

6. **Rubus luzoniensis Merr.** in Philip. Journ. Sci. Suppl. 1; 195, 1906.

A scandent shrub 5 to 6 m. high, with simple leaves, and terminal lax panicles, the branches, inflorescence, and under surface of the leaves densely pale ferruginous pubescent. Branches brown, terete, stiff, with scattered, small, usually somewhat retrorse spines, densely ferruginous pubescent. Leaves coriaceous, ovate to elliptical-ovate, 5 to 10 cm. long, 4 to 7 cm. wide, the base broad, truncate to slightly cordate, the apex acute or blunt, the margins rather finely dentate, not lobed, the upper surface dull or slightly shining, somewhat pilose on the midrib and nerves

and also with few scattered long hairs on the lamina, becoming nearly glabrous, the under surface pale and very densely pubescent, the midrib and nerves also with few scattered long hairs, the midrib with few scattered spines; nerves 6 to 7 on each side of the midrib, prominent, ascending, nearly straight, the reticulations prominent, subparallel; petioles 1 to 2 5 cm. long, densely pubescent and with small scattered spines. Inflorescence a terminal, rather lax penicle often 30 cm. long, the rhachis, branches and branchlets very densely ferruginous pubescent or pilose, and with scattered small spines, the branches irregular, distant, usually spreading, the lower ones often 15 cm. long, few flowered. Flowers white, short pedicelled, about 1.6 cm. in diameter, the bracts ovate lanceolate, densely pubescent, 5 mm. long or less. Calyx very densely ferruginous pilose, the lobes ovate to oblong-ovate, acute, about 6 mm. long. Petals oblong obovate, gradually narrowed below, obtuse, 6 to 7 mm. long, 3 to 4 mm. wide. Stamens indefinite; filaments glabrous, about 5 mm. long; anthers 0.5 mm. long. Ovaries many, somewhat pilose on one side above or nearly glabrous, the receptacle pilose; fruit unknown.

Only known in the mossy forest at about 6750 feet, district of Lepanto, Luzon.

7. **Rubus moluccanus Linn.** Sp. Pl. 1197, 1753. *R. sundaicus Blm.* in *Presl's* Epim. Bot. 197, 1849. *R. sundaicus Blm.* by *Rolfe* in Journ. Bot. 23; 212, 1885. *R. sundaicus Blm.* in *Vid.* Rev. Pl. Vasc. Filip. 122, 1886. *R. glomeratus Blm.* in Bot. Chall. Exped. 148. *R. glomeratus Blm.* in *Presl's* Epim. Bot. 197, 1849. *R. glomeratus Blm.* in *Miq.* Fl. Ind. Bot. 1, pt. 1; 381, 1855. *R. glomeratus Blm.* by *Stapf* in Trans. Linn. Soc. Bot. 4; 144, 1894. *R. glomeratus Blm.* in *Vid.* Rev. Pl. Filip. 122, 1886. *R. glomeratus Blm.* in *Vid.* Phan. Cum. Filip. 111, 1885. *R. cumingii Kuntze* Methodik 76.

A tall climber and scrambling over thickets and small trees; young branches rusty tomentose, provided with rather short recurved prickles. Leaves alternate, simple, scattered along the branchlets, subcoriaceous, somewhat broader than long, ovate or orbicular, or triangularly shaped, deeply cordate, mostly 5 to 7-lobulate, frequently subentire, 8 to 18 cm. long, correspondingly wide, those toward the ends of the

branches usually much reduced, serrately toothed, the serratures terminated into fine cusps, beneath tawny or grayish lanose, on the upper surface sparsely hispid or subglabrous except along the main nerves and either rugose or smooth; nerves conspicuous beneath, here and there provided with a small prickle, the reticulations evident; petiole terete, 4 cm. long, pubescent, strict, along the under side amply provided with recurved spines; stipule oblong, toothed or pinnatifid. Inflorescence terminating into branchlets, elongated or frequently very short, subpendulous; the branched portions of the inflorescence shorter than the leaves, paniculate, the lower ones arising from the uppermost leaf axils; peduncles varying in length, stout, yellowish pubescent, subtended by stipular bracts; pedicels at most 2 cm. long, similarly pubescent, subtended by smaller entire or toothed stipular bracts; the broad calyx cup 1.5 cm. wide, about as high, the 5 segments united below the middle, triangular in shape, acute, 8 mm. long, yellowish woolly on the outside, short grayish woolly on the inside, mostly entire; petals white, shorter than the calyx, obovate to oblong; stamens glabrous, inserted with the petals on the calyx throat; anthers broadly oblong, less than 1 mm. long; pistils strict, bearing oblique clavate stigmas; berry subglobose, carpels red, arising from a hairy receptacle.

In the Philippines there are three recognizable species in this group. *R. moluccanus Linn.* which is a powerful climber and abounds in woods at middle elevations. *R. rolfei Vid.*, a sprawling shrub inhabiting the highest mountains only. And *R. rugosus Sm.* a low shrub of the dry open plains. *Linnaeus*, species (see Rumph. Herb. Amboin. v. 88, t. 47, f. 2) has rather the small rounded and plainly rugose leaves of *R. rugosus Sm.*

The leaves of our Philippine forms are various, ovate to triangular in outline, apex obtuse to acute and even acuminate, ochroleucous or grayish beneath, glabrous or pilose on the upper surface, and in texture and structure are submembranous and not strictly rugose. *R. cumingii Kuntze* may easily prove to be a form of this rather common and widely distributed plant.

8. **Rubus rolfei Vid.** Phan. Cum. Filip. 171, 1885. *R. alceaefolius Vid.* (not of *Poir.*) Sinops. Atl. 25, t. 46, f. c. 1883. *R. rugosus Sm.* in Bot. Wilkes' Explor. 503, 1854.

A scrambling shrub or semiprostrate in habit; branches without prominent hooks, densely yellowish aracnoid pubescent, terete. Leaves 7 cm. across, alternatingly scattered, simple, palmately 3 to 5-lobed, the basal pair much smaller or not evident, with a very dense yellow matrix of hairs on the lower faveolate surface, glabrous or nearly so on the upper rugose surface, comparatively rigid, margins doubly dentate, cordate, the lobes rounded obtuse or even acute; veins prominent beneath, covered with a dense yellow tomentum, reticulations very numerous and pronounced; petiole 2 to 4 cm. long, covered with a similar tomentum; stipules grayish pubescent on the outer side, 1.5 cm. long, oblong, 5 mm. wide, entire along the inner edge, toothed on the outer edge, laciniately divided at the apex. Inflorescence terminal or occasionally from the uppermost leaf axils, racemose, comparatively short, congested and few flowered; flowers 1 to 3 in a cluster, subtended by thin rather large pectinate bracts; pedicels 1 cm. long, very densely covered with a reddish brown or yellow matrix of hairs; calyx mostly of 7 segments of unequal widths but of equal lengths, 2 cm. long, slenderly acuminate, the outer ones wider and densely covered with similar hairs, the basal one-third united, cinereous on the inner surface above the middle; petals whitish, not exceeding the calyx segments, 5, deciduous, 10 to 15 mm. long, elliptic oblongish to obovate, apex rounded, abruptly narrowed or clawed at the base, inserted upon the throat of the calyx; stamens numerous, subequal, not equalling the petals, strict; filaments glabrous, inserted upon the calyx throat; anthers oval or ellipsoid, less than 1 mm. long, basifixed; styles similar to the filaments, terminated by small clavate stigmas; berry red, conical to subglobose.

Based upon *Cuming's* number 808 and *Vidal's* number 294 from mount Banahao, Tayabas province, Luzon, at 5500 feet altitude. Since then collected on mount Halcon, Mindoro, and on Canlaon volcano, Negros.

9. **Rubus rugosus Sm.** in Rees Cycl. No. 30.

A low spreading shrub, 1. m. high, with many rigid branches; stems terete, brown, beset with fine erect or recurved prickles; twigs also prickly, dirty yellow tomentose. Leaves more or less crowded, scattered, coriaceous, flat, green on the

upper side, ovately rotund in outline, mostly 3-lobed although the lateral lobes are in the larger blades themselves lobulate, glabrous above or with a few long whitish hairs scattered in between the very prominent rugose excrescences, the lobes rounded or merely obtuse, the base deeply cordate, all less than 6 cm. across, margins denticulate, beneath densely covered with a grayish yellow woolly matrix; nerves very conspicuous beneath, only the larger ones apiculate toward the base, the reticulations minute, very evident; petiole stout, similarly pubescent and spinulose, 1 to 3 cm. long, strict; stipules 1 cm. long, oblong, glabrous on the inner side, pubescent otherwise, mostly laciniate. Inflorescence terminal and from the leaf axils, strict; flowers more or less crowded, usually 1 to 3 upon 1 cm. long peduncles, subtended by ample stipular bracts; calyx cup-shaped, the 5 sepals united at the base, villous on the exterior, lanose on the interior, 12 mm. long, the acuminate segments entire or the broader ones divided at the apex; petals white, 8 mm. in length, broadly obovate, nearly as wide, abruptly terminated at the base into a short claw; stamens 5 mm. long, inserted with the petals upon the calyx throat, with elliptic anthers 0.5 mm. long; pistils glabrous, equalling the stamens, bearing comparatively large clavate stigmas; berry flattened, yellow, with a stringent flavor.

So far we know this characteristic species only from the grass lands in the higher altitudes of Benguet and Lepanto provinces, Luzon. It is referred to the obove name with some uncertainty.

10. **Rubus ellipticus Sm.** in Rees Cycl. 30, No. 16.

A straggling or suberect shrub, 1 to 3 m. high; branches spinescent, tomentose, densely covered with reddish bristle like hairs. Leaves alternatingly scattered, 3-foliate, 7 to 13 cm. long; peduncles strongly spinescent along the under side, pubescent and bristly hairy, stout, straight, 2 to 5 cm. long; leaflets 3, the lateral pair upon 2 mm. long and the larger terminal one upon a 2 cm. long petiolule, subchartaceous, rotund elliptic to broadly obovate, apex broadly rounded to subtruncate or occasionally subemarginate, base rounded, dark green and glabrous on the upper side, pallescent and tomentose on the under side, the average blade

5 cm. wide, finely toothed or serrate; nerves pronounced on the lower side, depressed on the upper, oblique, strict, 7 to 9 pairs, tips anastomosing; stipules 1 cm. long, linear, pubescent. Panicles terminating the branches, elongated, 2 to 3 dm. long, the lower branches arising from the uppermost leaf axils; floriferous peduncles varying in length, pubescent and bristly, strict; secondary peduncles and pedicels from 1 to 2 cm. long, subtended by pubescent linear bracteoles; calyx 8 mm. long, united below the middle, pubescent and bristly toward the base, the 5 segments obtuse to acute and entire, the upper portion similarly pubescent on both sides, the midnerve usually protruded into a short point; petals 5, alternating with the sepals, and inserted upon the calyx throat, white, 7 mm. long, 3 mm. wide, oblanceolate or narrowly obovate, gradually tapering to the base, somewhat pubescent especially toward the base; stamens 3 mm. long, glabrous; the filaments subcompressed, bearing subelliptic anthers; pistils somewhat shorter than the stamens, arising from a conical hairy receptacle; berry golden yellow, subglobose.

Not uncommon in dry, grassy, well drained soil of shallow ravines along streamlets of Benguet province, Luzon. Not yet collected elsewhere in the Philippines.

11. **Rubus copelandi Merr.** in Philip. Journ. Sci. Suppl. 1; 194, 1906.

An ascending plant 1 to 1.8 m. high, with trifoliate leaves and solitary axillary white flowers, or sometimes two or more pedicels from the upper axils, the stems, petioles and pedicels with usually slender, recurved spines, and slender spine-like capitellate hairs. Stems terete, greenish or reddish, not at all pubescent, the spines and intermixed capitellate hairs rather numerous. Leaves alternate, trifoliate, the petioles about 3 cm. long, spiny and with capitellate stiff hairs, the stipules ovate-lanceolate to oblong ovate acuminate, nearly 1 cm. long, foliaceous, capitellate hairy; leaflets ovate to elliptical-ovate, acuminate, firm, brittle when dry, glabrous on both surfaces, except the somewhat pubescent midrib above, paler beneath, 4 to 7 cm. long, 2 to 4 cm. wide, rather adruptly acuminate, the base broad, rounded, that of the lateral leaflets often inequilateral, the mar-

gins dentate or bidentate, the teeth small, mucronate acuminate; nerves about 10 on each side of the midrib, rather prominent, parallel, the midrib and often the lateral nerves with retrorse spines beneath, petiolules of the terminal leaflets 1.5 cm. long, of the lateral ones 1 to 2 mm. Flowers white, 2.5 to 3 cm. in diameter, the pedicels 1 cm. long or less, spiny and with capitellate hairs. Calyx cinereous pubescent or puberulent, the lobes with few slender spines and capitellate hairs, ovate lanceolate, acuminate, often 1 cm. long, 5 mm. wide or less. Petals elliptical, rounded, somewhat narrowed below, about 12 mm. long, 8 mm. wide, distinctly veined. Stamens indefinite; filaments 4 to 5 mm. long, glabrous; anthers 1 mm. Ovaries many, glabrous. Receptacle glabrous. Fruit red, ovoid, about 1.5 cm. long, glabrous.

In thickets near border of the mossy forest at about 6500 feet. A species characterized by its trifoliate leaves, solitary large flowers, and peculiar capitellate, almost spine-like hairs. Known only from the province of Benguet, Luzon.

12. **Rubus clementis Merr.** in Philip. Journ. Sci. 3, Sect. C; 139, 1908.

Scandens, ramis ramulis inflorescentiisque plus minus pubescentibus et aculeis brevibus reflexis armatis; foliis trifoliolatis; paniculis terminalibus, gracilibus, usque ad 60 cm. longis, pendulis; calycibus dense pubencentibus.

Scandent. Branches terete, rather slender, reddish-brown and with the branchlets more or less pubescent and armed with scattered reflexed short spines. Leaves trifoliolate, their petioles 5 to 7 cm. long, somewhat pubescent, aculeate, the petiolules of the lateral leaflets about 5 mm. long, of the terminal one aculeate and 2 to 3 cm. long; leaflets ovate to elliptical-ovate, chartaceous, 8 to 12 cm. long, 4.5 to 6.5 cm. wide, base rounded, apex slenderly acuminate, the margins above rather strongly serrate, teeth apiculate, glabrous except the nerves of both surfaces, which are somewhat pubescent, the midrib beneath with few spines; nerves 7 or 8 on each side of the midrib, curved ascending, very prominent beneath, the reticulations prominent, subparellel. Panicles terminal, rather slender, pendulous, 60 cm. long or less, the lower branches 10 cm. long or less, the rachis, branches and branchlets pubescent and with scattered reflexed spines, the branches

distant, spreading, few-flowered, gradually smaller upward. Flowers white or greenish white; the bracts and bracteoles ovate-lanceolate, acuminate, about 2 mm. long; the pedicels densely pubescent, 2 to 6 mm. long. Buds globose, densely gray-pubescent. Sepals broadly ovate, about 5 mm. long, 5 mm. wide at the base, short-acuminate. Petals glabrous, orbicular-obovate, apex broad, rounded, base somewhat acute, 6 to 7 mm. long. Stamens, carpels, and styles glabrous.

So far only known from central Mindanao, the type locality.

13. **Rubus lasiocarpus Sm.** in *Rees* Cycl. 30, No. 6. *R. horsfieldia Miq.* Fl. Ind. Bat. 1, (pt. 1); 375, 1855.

A large rambling shurb, 3 m. high; branches terete, glaucous at first, ultimately wearing brown, provided with many stout straight sharply pointed spines; twigs witish, smooth, with more or less recurved prickles. Leaves variable, 5 to 10 cm. long, imparipinate, alternate, scattered and more or less crowded at the base of the branchlets; peduncle 1 to 3 cm. long, slender, pubescent, when young with sharply hooked spines; leaflets 5 to 7, nearly of equal size, ovately lanceolate to oblongish, grayish white and lanose or tomentose beneath, serrately dentate, glabrous above except the veins which are occasionally strigose, sessile, the terminal one upon a 5. mm. long petiolule, submembranous, the normal ones 3 cm. long and obout one half as wide, obtuse or acute at apex, mostly rounded at the base; nerves strict, very oblique, conspicuous beneath, sunken on the upper surface, 7 to 9 pairs, cross bars or reticulations obsolete; stipule 8 mm. long, linear lanceolate, entire, glaucous and pubescent. Inflorescence short paniculate or corymbose, terminal or from the uppermost leaf axils; peduncle and pedicels pubescent, occasionally provided with spicules, subtended by stipular bracts; calyx 7 mm. long, nearly as wide, pubescent on both sides, the segments united at the base and terminated in acuminate points; petals rarely exceeding the calyx segments, orbicular or broadly obovate, pink or whitish, easily falling, conspicuously clawed at the base, filaments glabrous, somewhat flattened toward the base, subequal, 3 mm. long, with the petals inserted upon the

calyx throat; anthers ellipsoid, 0.6 mm. long; style less in length than the filaments, also glabrous, terminated by minute capitate stigmas; ovary villous; berry subglobose, flattened, reddish.

Rare in open shallow ravines along streamlets of Benguet province, Luzon.

14. **Rubus fraxinifolius Poir.** Ency. 6; 242. *R. rosaefolius Vid.* (not of *Smith*) Sinops. t. 46, f. d. 1883. *R. celebicus Blm.* in *Presl's* Epim. Bot. 196, 1849.

Numerously branched shrub, 3 to 5 m. high, with terete stems which finally turn brownish; branches lax, widely spreading, green, smooth except for the prickles of which there are many or only a few. Leaves alternate, scattering, imparipinnate, greatly varying in size, the average one 15 cm. long; petiole smooth, usually prickly beneath, 3 to 5 cm. long, bearing in the axils a tuft of bracts and a pair of simple leaves; leaflets 5 to 7, coriaceous, glabrous, lighter green beneath, serrate, the serratures terminating into cusps, ovately lanceolate, rounded at the base, gradually tapering into acuminate to caudate points, 4 by 19 mc. in size, although variable in size and shape; petiolules 1 to 4 mm. long, glabrous except the sulphur yellow pubescence on the upper side; stipule glabrous, subulate, mostly entire but the broader ones laciniately divided, 1 cm long; nerves 9 to 13 pairs, strict, brown and very oblique, prominent beneath, conspicuously sunken on the upper surface. Panicle terminal, several to numerously flowered, subpendulous, often very large; branches divaricate, smooth, reddish brown, subtended by ample, glabrous, laciniate bracts; pedicels slender, 1 to 3 cm. long, usually with 1 or 2 bracteoles; calyx segments united toward the base, 15 mm. long, gradually tapering to the acuminate or caudate apex, glabrous on the exterior, tomentulose on the inner surface and along the overlapping outer edge; petals white, elliptic to obovate, obscurely clawed at the base, 10 mm. long, 7 mm. wide; stamens glabrous, 3 to 4 mm. long, subequal, inserted upon the calyx throat; anthers versatile, 0.75 mm. long, ellipsoid; style terminated by minute capitate stigmas; conical receptacle nearly glabrous; berry red, elongated with numerous carpels.

Rather constant in general characters and widely distributed in the Philippines at middle elevations of mountainous districts.

15. **Rubus fraxinifolius haightii Elm.** n. var.

Leaflets smaller, sharply pointed, covered with bristle like glandularly terminated hairs, and the more numerous branchlets provided with many flattened strongly recurved spines.

Type specimen collected by *Maj. E. A. Mearns* near *Mr. Haight's* place in the mountains of Benguet province, Luzon, August, 1907.

16. **Rubus tagallus Cham. et Schlecht.** in Linnae 2; 9, 1827.

Low shrub; branches terete, tomentose, sparsely covered with recurved spines. Leaves 2 to 3 imparipinnate, or toward the ends of the branchles 3-foliate; leaflets ovate, more or less acuminate, the mature ones 1 to 2 cm. apart, strigosely pubescent on both sides, eglandular, much paler beneath, the terminal one somewhat larger, base rounded or subcuneate, the lower ones very short petiolate, the upper ones sessile, margins doubly serrate, the secondary serratures terminating into minute cusps, the primary serratures occasionally subincised; nerves yellowish brown, quite evident beneath, oblique, 5 to 8 pairs; petiole 2 cm. long, slender, occasionally beset with hooks, pubescent; stipule setaceous, 6 mm. long, hairy. Inflorescence terminal, solitary or several flowered; peduncles 1 to 3 cm. long, strict, frequently provided with linear bracts; the 5 calyx segments united below the middle, hirsute on the dorsal side, cinereous or grayish tomentulose on the ventral surface, 12 mm. long, 3 mm. wide at the base, gradually tapering to the laciniate apical portion, edges entire; petal white, oblong to obovate, 8 mm. long, rounded at apex, base without claws; berry ovoid and red, with numerous achenes.

Type collected in Cavite province toward the Taal volcano. Smaller in habit, more tomentose and with smaller and rounded leaflets than *R. rosaefolius Sm.* as far as the Philippine plants are concerned. Common in dry places from most of our islands.

17. **Rubus rosaefolius Sm.** Pl. Ic. Ined. 3, t. 60. *R. jamaicensis Blco.* Fl. Filip. ed. 1; 427, 1837, *R. comintanus Blco.* l. c. ed. 2; 298, 1843.

A subscandent woody shrub; branches with rather long glandular hairs and with a few polished hooks. Leaves pinnate, 5 to 12 cm. long; leaflets 3 to 7, membranous, lanceolate or ovate lanceolate, unequally incised, serrate, rarely with 1 or 2 basal lobes, acuminate, rounded at the base, rarely strigose on the upper surface except the villous nerves and midrib, beneath less strigose but usually glandular, 3 to 8 cm. long, 1 to 3 cm. wide; peduncle 2 to 3 cm. long, provided with recurved spines; petiolules 1 to 3 mm. long; stipules linear to acuminately lanceolate; nerves 6 to 10, ascending, brown, not conspicuous. Flowers terminal, 1 to 3-paniculate, upon 2 cm. long peduncles which are usually bracteate below the middle, glandular pubescent; calyx entire, lobes 5, lanceolate, acuminate, or even caudately tipped, glandular on the outside, lanose pubescent on the inside, united toward the base, 12 mm. long; petals equalling the calyx segments, white, equal in number, broadly obovate, abruptly narrowed at the base; numerous stamens subequal, with the petals inserted upon the calyx throat, 5 mm. long, glabrous; anthers oblong, 0.75 mm. long; styles glabrous, terminated into small clavate stigmas; berry elongated, bearing numerous red achenes upon a glabrous receptacle.

This from or species is intermediate between *R. fraxinifolius Poir.* and *R. tagallus C. et S.* Subglabrous specimens can be distinguished from the former by the less coriaceous leaves which have more numerous and very prominent nerves. Subpubescent specimens differ from the latter in being glandular and in having usually larger more acuminate leaflets. *R. tagallus C. et S.* is a low dwarfed species not subscandent in habit; *R. fraxinifolius Poir.* is a larger rambling shrub with more numerously flowered panicles. Throughout the Philippines.

LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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THREE SCORE OF NEW PLANTS

BY

A. D. E. ELMER.

—o—

GRAMINEÆ.

ISACHNE R. Br.

Isachne stricta Elm. n. sp.

Tufted; stems 9 to 14 dm. long, 2 mm. thick, many from the root cluster, terete, strict, straw colored toward the base, yellowish green toward the top, quite rigid, somewhat recurved at the top, sparingly branched. Leaves scattered especially above the middle, flat, ascending, quite stiff, paler beneath, margins thickened and scabrous, pale green and minutely fluted on the upper side, beneath palescent or glaucous, green and sparsely beset with whitish strigose scabrid hairs, linear lanceolate, 15 cm. long and 8 mm. wide or larger, apex slenderly acuminate, base roundly constricted; nerves beneath straw color; the lower sheaths shorter than the internodes, the upper ones overlapping, striate, nearly smooth, well separated toward the throat, the margins ciliate pubescent; ligule obsolete or represented by a fringe of white ciliate hairs. Panicle strict, the upper portion slightly recurved, yellowish green, the younger ones enclosed by the uppermost leaf sheath, even the basal portion of the mature panicle enclosed, about

2 dm. long and 2 cm. wide across the middle; rachis and branches green, angled; the latter slender, ascending, forming a compact lanceolate panicle; pedicel 1 mm. long or only a fractional part of one; spikelet 1 to 2 flowered, usually the second floret sterile; empty glumes green, 1 mm. long, obscurely striate; the lower one usually more spreading, the margins incurved, apex rounded or subtruncate, a few strigose hairs from the back near the apex; the upper one without the ciliate hairs, oblong to obovate; palea thicker in texture, attached to a callous base, broadly rounded, margins incurved, 0.75 mm. long, glabrous or only minutely scabrid along the margins, enclosing the palet; palet nearly as long, of the same texture, spatulate in outline, margins strongly incurved; stamens 3, enclosed by the palet; filament 0.25 mm. long, hyaline, confluent at the base, attached to the middle; anthers narrowly elliptic, 0.33 mm. long, deeply cleft at both ends; upper floret sterile; pistils minute, hyaline, with 2 stigmas.

Type specimen 10425, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

This slender and strict species was discovered in shallow soil of rock crevices upon seepage ledges and cliffs of the Bonyao river at 3000 feet. The tufts tightly rooted themselves into the rock clefts. Not found elsewhere.

Distinct from *I. albescens Trin.*

ULMACEÆ.

CELTIS Tourn.

Celtis rubrovenia Elm. n. sp.

Apparently a shrub; branches numerous, rather thin, terete, brown. Leaves flat, submembranous, horizontally spreading, the slender acuminate tips somewhat recurved, alternatingly scattered along the twigs, ovately lanceolate, quite variable in size, the normal ones 6 cm. long by 3 cm. in width below the middle, glabrous, punctate, much paler green beneath at least when dry, margins entire or on the sides above the middle with a few obscure serrate teeth, base rounded

or frequently obtuse; petiole 3 to 5 mm. long, provided with yellowish brown strigose hairs; nerves 3 to 5 but usually only 3 from the base and running parallel with the mid-vein, in the larger blades with a pair arising from above the middle, glabrous, or with a few hairs, prominent beneath, dark brown or reddish brown, secondary nerves also prominent. Infrutescence ascending, axillary, 2 to 3 cm. long, not exceeding the foliage, from 3 to 7-fruited; peduncle light brown, provided with hispidulous hairs, branched into pedicels from about the middle; pedicels strongly ascending, 0.5 cm. to 1 cm. long, very slender and straight, persistent, very sparingly rebranched, similarly pubescent; fruits ovoid to ellipsoid, glabrous, darker green than the foliage, upon a dull white rim, more tapering at the apex, hard, 1-celled, obscurely angled when dry, 5 mm. long, about 4 mm. in diameter through the middle.

Type specimen 8775, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

Rare in the Philippines and only once or twice collected before in the type locality. Apparently the same as 6010 *Elmer* with young pistillate flowers collected four years ago in the same place. Distributed under *Grewia*.

URTICACEÆ.

ELATOSTEMA Forst.

Elatostema laxa Elm. n. sp.

A laxly branched shrub; stems hanging from cliffs, numerously branched, easily breaking, green and smooth, the larger ones 3 cm. thick; twigs terete, slender, occasionally quite crooked. Leaves flat, subpendulous, membranous, smooth above, much lighter green on the lower glabrous surface, scattered along the twigs, 1 to 3 cm. apart, alternate, the normal blades 13 cm. long by 5 cm. wide across the middle, slenderly acuminate toward the apex, base obtuse or obliquely rounded, most of them subfalcate and inequilateral below the middle, the lower edge and of the upper above the middle serrately dentate; nerves primarily 3, from the base, 1 to 3 sec-

ondary lateral ones joining it above the middle, coarsely reticulate; bud bract 3 to 10 mm. long, glabrous; stipule acuminate, 7 mm. long. Inflorescence in dense sessile heads, in the leaf axils or in the axils of the leaf scars, from 5 to 10 mm. in diameter, not surrounded by an involucre; pistillate flowers numerous, subtended by many acuminate sparsely ciliate 1 mm. long bracts; pedicel equal in length, flattened, only sparsely ciliate; perianth 1 mm long, glabrous, the 5 outer ones oblanceolate and incurved, the 5 inner ones lanceolate and opposite; ovary glabrous, 0.5 mm. long, ellipsoid, bearing at the apex a bunch of hairy stigmas; achene brown, very finely scabrous, 0.75 mm. long, triangular.

Type specimen 10337, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

A very lax and slenderly branched shrub hanging on cliffs near the Bonyao river at 1250 feet. It has very much the general foliage appearance and lax branching habit of certain Philippine *Pipers*.

In the field I took it for a very large lax form of *E. rigidum Wedd.* but it is most unlike 1674 *Cuming*. It is, however, very similar to *E. rostratum Miq.*, but more dissimilar to *E. rostratum manillensis Wedd.*

Elatostema hastatum Elm. n. sp.

Succulent herb; stems prostrate, trailing, the sparse branches suberect, easily breaking, terete, green, covered with dirty setose hairs, 2 mm. thick. Leaves submembranous, nearly flat, alternatingly scattered in distichous rows, 3 to 5 mm. apart, subglaucous green on the upper side, pale or light green beneath, squarrosely oblong, 15 mm. long by 6 mm. wide, dark brown on the upper side when dry, much lighter beneath, divaricate, pseudostrigose on both sides, the nerves only sparsely strigose or more densely so on the lower side toward the base, beneath very finely glandular, subsessile, the basal one half with entire margins, coarsely dentate above the middle, inequilateral, the apex obtuse in outline, the base oblique and with a deep sinus, the lower portion extended into a 3 mm. long ascending hastate lobe which lies over the stem; nerves delicate, the lower side 3 the upper side only 2-nerved; stipule ciliate, 2 to

3 mm. long, linearly oblong. Inflorescence in dense capitate sessile axillary clusters, suberect and crowding over the upper side of the stem, each cluster several flowered; involucre ciliate or strigose on the outer side, 3 to 4 mm. long, the 3 or 4 broad segments falsely united at the base, pseudostrigose and finely glandular; the individual flowers subtended by 3 hyaline finely ciliate unequal bracts about 3 mm. long; pedicels delicate, 2 mm. long, glabrous; perianth 2 mm. long, sparsely ciliate, united below the middle, hyaline, the free portion of the 5 segments oblong; stamens 5, opposite the perianth segments, inflexed in the bud; filaments a trifle longer than 1 mm., glabrous, inserted upon the perianth some little distance below the middle; anther oblong, 1 mm. long, lobed at the base, basifixed; pistillate flowers not seen.

Type specimen 9829, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

This unique creeper forms dense patches on humus covered ground of dense moist woods at 4000 feet. My native Visayan called it "Coyonap".

It is at once distinguished from *E. podophyllum Wedd.* based upon 789 *Cuming* by its different habit and by the conspicuous hastate leaf base.

Elatostema delicatum Elm. n. sp.

A branched herbaceous creeper; stems and branches yellowish green, 1 mm. thick, covered with dirty yellowish white strigose hairs; the branches sparingly rebranched, mostly rooting from opposite the leaves. Leaves equally scattered along stems and branches, alternating and averaging 6 mm. apart, thin, drying light green, somewhat paler beneath, glabrous on both sides except the nerves beneath, flat, the larger ones 12 mm. long, 9 mm. wide, but frequently much smaller, orbicular to rotund, or the larger ones oblongish and with widely subtruncate ends, entire or in the larger ones coarsely 3 to 5 crenately dentate at the apex, base suboblique and emarginate or obscurely cordate, inequilateral, subsessile; nerves beneath strigose, not conspicuous, with 2 to 3 lateral pairs: stipules minute or obsolete. Inflorescence upon 5 mm. long very slender setosely pubescent peduncles, solitary or occasionally 2 or 3 from the same leaf axils; involucre light or

yellowish green, 5 mm. long, united at the base, laciniately divided, strigosely pubescent on the back, margins hyaline; pedicels of staminate flowers when in anthesis 5 mm. long, strigose, hyaline; perianth 4-segmented, hyaline, finely strigose, tips acuminate or tailed, about 3 mm. long; stamens 3 or 4; hyaline filaments nearly 2 mm. long, glabrous; anthers 1.25 mm. long, 0.75 mm. wide, oblong, divided from the base, basifixed; female inflorescense a sessile dense cluster, in the leaf axils, several-flowered; involucre and perianth segments similar, 1.5 mm. long, linear, bearing numerous long well interlaced woolly hairs; pedicels very short, glabrous; ovary oblong, 0.25 mm. long, bearing a terminal sessile stigma; achene nearly 0.5 mm. long, triangular, glabrous, with acute ends.

Type specimen 10343, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

Discovered on a cool dry ledge thinly covered with earth, in a deep wooded canyon along the Bonyao river at 1500 feet altitude.

This fine species somewhat resembles *E. obovatum Wedd.* but is more delicate than 628 *Cuming*. Leaves not pseudo-strigose on the upper side, much larger, differently shaped, and the few teeth coarse and crenate.

Elatostema spinulosum Elm. n. sp.

Very succulent herbs; stems angular, dark green, watery, ridged from the base, reclining, 3 cm. thick near the base, ultimately suberect and from 3 to 6 dm. high, unbranched, rooting from the lower joints, spinulescent. Leaves widely scattering, also spinulescent especially beneath, heavy, slightly ascending, dark green above, paler beneath, the lower leaves a trifle smaller, glabrous, the medium blades 2 dm. long by 8 cm. wide above the middle, inequilateral, obscurely falcate, oblongish obovate in outline, margin toward the base subentire especially so along the upper straighter edge, otherwise coarsely dentate especially toward the rounded apex which terminates into an acute point, subsessile; at the base the lower side subauriculate, the side upper originating some distance from the point of attachment; veins very conspicuous beneath in the dry state, very deep green when fresh; the basal pair originating from near the base and sub-

opposite, parallel with the margins, farther up coarsely anastomosing with the 3 to 5 lateral pairs, the reticulations very coarse and evident; stipule membranous, about 1 cm. long. Inflorescence in broad capitate clusters, from the upper leaf axils, quite solid, upon short and stout peduncles, usually somewhat flattened, about 1 cm. high, 2 to 3 cm. across; the cup-shaped involucre subglabrous, subtruncate, united or divided into 2 equal halves; flowers few to several clustered, each cluster subtended by more or less unequal 7 mm. long hyaline margined bracts, the larger ones of which bear a few fine spinules along the middle portion of the back; pedicel 1.5 mm. long, glabrous, flattened; perianth 3 mm. long, hyaline, confluent but ultimately separating into 3 to 4 segments; anthers oblong, 1.5 mm. long, lobed on the lower end and which in the buds are inverted, basifixed; filaments very fine, inserted upon the basal portion of the perianth; pistillate flowers not seen.

Type specimen 9776, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

This coarse *Elatostema* forms patches in moist humus covered soil near a spring in dense woods at 4000 feet. In this plant I noticed the stamens burst out of the flabby subviscid perianth instantaneously and with considerable force. In the but state the filaments are inflexed and the anthers inverted, and it appears that the tension or spring power lies in the more or less rugose twisted portion of the former organs. The shock is heavy enough to shed all the pollen out as a cloud. The filament springs to a far recurved position with the empty anther still intact with the lobed end below. In Visayan "Handalumog."

LORANTHACEÆ.

LORANTHUS Linn.

Loranthus cuernosensis Elm. n. sp.

Parasitic bushes; stems at the base 2 cm. thick, usually solidly attached and climbing along the host, roughly lenticelled; branches quite slender, green, terete, brown, globose.

Leaves opposite, from the swollen nodes, scattered along the twigs, very coriaceous, readily breaking, flat, glabrous, much paler green beneath, sessile, becoming detached, ovately lanceolate or oblongish, unequal in size, the normal ones 15 cm. long, 5 cm. wide below the base, perceptibly inequilateral, the upper portion gradually tapering into the acute or acuminate bluntly pointed apex, base obtuse or broadly rounded and occasionally suboblique; nerves obscure, the 3 to 5 lateral pairs ascending. Inflorescence in small sessile axillary clusters; calyx glabrous, the basal one half tubular, the truncate brown rim 1.5 mm.high, ultimately 2 to 3-parted; corolla slightly curved, tubular but soon splitting below the middle and at the apex, at least 2 cm. long, thicker and red below the middle; the 5 segments ligulate, thick, glabrous on both sides, 1-nerved, apex acute, yellowish above the middle; stamens opposite the corolla segments, not exerted, yellow; filaments 3 to 4 mm. long, glabrous, flattened, attached to the inner side of the corolla; anthers equal in length, linear, apiculate at the apex; style glabrous, red toward the base, otherwise yellowish, terminating in a red stigma; ovary inferior, 1-celled; fruit ovoid to ellipsoid, 8 mm. long, 5 mm. in diameter, bearing the persistent calyx rim, dark red when mature and persistently covered with brown scurfy scales; the solid viscid meat encasing a single obconical seed.

Type specimen 9525, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

This *Loranthus* was collected upon small trees in damp woods at 3500 feet.

From *L. cauliflorus Merr.* it is distinguished by its much smaller leaves and axillary inflorescence. Our specimen has the leaves of *L. mirabilis Van Huerck* and *Muell. Arg.* (*L. cumingianus* (*Van Tiegh.*) *Engl*), but the flowers are not 5-merous nor pedicellate, and the inflorescence not cauline.

Loranthus bicoloratus Elm. n. sp.

A rigid busy parasite; stems yellowish gray, the twigs smooth, the larger stems roughly lenticelled, sparingly rebranched. Leaves dull green above, paler green beneath, thickly

coriaceous, subverticellate, varying in size, oblong or broadly lanceolate, apex obtuse or acute, the entire margins rather thin edged, glabrous, the average blades 12 cm. long by 5 cm. wide across the middle, the base acute to obtuse or cuneate, easily detached, occasionally slightly inequilateral; petiole stout, glabrous, 7 to 14 cm. long; nerves obscure, the 3 to 5 lateral pairs ascending and barely visible. Inflorescence axillary and lateral, cymosely branched above the middle; peduncle solitary or 2 to 3, strict, glabrous, 1 to 2 cm. long; pedicels usually curved, glabrous, 3 to 5 mm. long; calyx 4 mm. long, 3 mm. across the top, turbinate, the entire truncate apex at least 1 mm. deep, subtended at the base by stout obtuse 1.25 mm. long bract, green; corolla mostly pendulous, coriaceous, glabrous, 3 cm. long, prior to anthesis tubular and with constricted ends especially at the apex; petals ligulate, the apical portion strongly reflexed, ultimately divided into 5 segments, the somewhat inflated basal two thirds portion deep scarlet red, the upper portion yellowish green; stamens opposite the segments, yellowish green; filaments erect, 4 mm. long, flattened, inserted upon the petals; anthers linear, at least as long as the filaments, included but exposed after the petal tips become reflexed; slender style reddish in the tube, yellowish green toward the apex; young fruit 8 mm. long, ellipsoid, quite smooth.

Type specimen 9950, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

Collected on *Leucosyke* of a steep densely thicketed ravine at 2500 feet. It was not infrequently met, and the name the natives give it is "Manoag."

The leaves are much larger and differently shaped than in 1973 *Cuming* on which is based *L. acutus* (*Van Tiegh.*) *Engl.* Our specimen can not be referred to *Elytranthe cumingii* (*Van Tiegh.*) *Engl.*, though possibly it should be referred to that genus.

NOTOTHIXOS Oliv.

Notothixos philippinense Elm. n. sp.

Parasitic, forming bushes; stems and branches easily breaking, greenish, brown in the dry state, the longitudinally

checked open portions whitish, terete, nodulose at the point of branching; twigs slender, lax, yellowish pulverulent especially toward the ends. Leaves copious, opposite, subcoriaceous, glabrous and dull green on the upper side, ashy gray on the other, subentire or obscurely crenate, flat, the average blades 5 cm. long by 2.5 cm. wide below the middle, ovately lanceolate or even subelliptic, the smaller ones lanceolate and densely covered with golden or flavus yellow especially beneath, apex gradually tapering and terminating in a blunt point, base obtuse or nearly rounded; petiole not distinct, gradually tapering into the blade, yellowish pulverulent; stipules none; the 3 parallel nerves obscure, plainer on the upper side. Inflorescence a spicate raceme, axillary, strict, varying from 2 to 5 cm. long, flavus yellow; flowers monoecious, without a calyculus; branches subwharled, subtended by short yellow bracts, 5 to 10 mm. long or much shorter, occasionally the basal longer ones rebranched; flowers bunched at the flattened end of the branches or branchlets, sessile, densely clothed with the yellow powder or bloom; pistillate flowers 2 mm. long, 1 mm. thick, subcylindric, terminated by 4 short triangular teeth; ovary completely buried, the callous disc bearing a sessile stigma; staminate flowers subglobose, 1.5 mm. thick, its 4 triangularly obtuse segments cleft; stamens less than 0.75 mm. long, inserted upon a more or less lobed disc; fruit ellipsoid or subglobose, sessile, bearing at the apex 4 persistent calyx segments, 6 mm. long, white, juicy; seed solitary, green, compressed, elliptic, 4 mm. long, 2.5 mm. wide, the apex provided with 2 sublateral 1.5 mm. long strict appendages.

Type specimen 10114, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Negros Oriental, Negros, May, 1908.

Dense, numerously branched masses upon the lower limbs of a large *Canarium* tree at 1000 feet. Fruits sweet. The genus has not previously been reported from the Philippines.

Of the five or six known species, ours is most similar to the Australian *N. subaureus* (*F. v. Mull.*) *Oliv.* but much slenderer, with leaves twice as large, and with a differently branched inflorescence.

ANONACEÆ.

GONIOTHALAMUS Hook. f. and Thoms.

Goniothalamus magnificus Elm. n. sp.

Tall slender trees, 10 m. high; branches rather rigid, covered with smooth yellowish bark. Leaves scattering along the branchlets, not numerous, subcoriaceous, flat, glabrous, dark shining green above, paler beneath, unequal in size, oblong, the two ends nearly equally tapering, apex acute to acuminate, base obtuse, the entire margins finely involute, the average blades 3 dm. long, 7 cm. wide for the greater length; nerves faint but equally visible from both sides, more or less divaricate but upwardly arched and reticulately united, 19 to 23 on each side, the coarse reticulations nearly as prominent, the midrib caniculate above and prominently subkeeled beneath; petiole 12 mm. long, glabrous, 4 mm. thick near the base; fruits lateral or from the leaf axils, capitately clustered upon 7 cm. long stout subrecurved peduncles which are more or less thickened toward the apex; receptacle globose, 12 mm. in diameter; carpels smooth, green, 3 to 4 cm. long, 1.5 to 2 cm. thick, more abruptly pointed at the apex, base substipitate, subterete, the dorsal side nearly straight, the ventral side more bulging and with an evident suture, radially spreading; ovules 2, superposed.

Type specimen 7419, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906.

In the woods at 3000 feet on mount Banahao. Not common, only here and there an individual tree is found.

Not *G. philippinensis Merr.* which has thick leathery leaves with obscure reticulations; it is, however, identical with 1746 *Cuming* and which was determined as *G. giganteus Hook. f.* and *Thoms.* Very different from the last named species.

SAXIFRAGACEÆ.

HYDRANGEA Linn.

Hydrangea glandulosa n. sp.

A powerfull tree climber, stems about 3.5 cm. thick;

branches quite rigid, characteristically curved and crooked, forming dense tangled masses, wood moderately hard, tough, whitish, with a cinnamon brown pith, old bark brown, peeling in thin scales; twigs verticellately disposed, rufous tomentose, with stellate tuftlets. Leaves scattered, opposite, lucid, very rigid, dark green above, paler and glandular punctate beneath, quite variable in size, the normal ones 1 dm. long, 6 mm. wide across the middle, rounded and frequently inequilateral at the base, apex acute to obtuse, oblong or the smaller ones subelliptic, margins entire; petiole 2 to 4 cm. long, at first rufous tomentose, ultimately wearing glabrous, the base broadly expanded; midvein very prominent beneath; the lateral 7 to 10 pairs ascendingly curved, tips anastomosing, tufts of hairs in the axils, otherwise glabrous, numerous reticulations plainly visible. Inflorescence terminal, mostly on the subterminal ascending twigs, yellowish or rufous tomentose, corymbosely spreading, nearly 1.5 dm. wide; primary peducles subcompressed, rufous hairy, subtended by deciduous subglabrous bracts, branched at irregular lengths, the outer ones terminated by sterile showy flowers; branchlets arranged along the upper side and bearing erect flowers; terminal pedicels very short, the lateral ones 2 to 3 mm. long; calyx perigynous, becoming entirely glabrous, turbinate, 2 mm. long, as wide across the top, truncate; petals 4, early falling, 2.5 mm. long, obtuse, 1.5 mm. wide, with broad bases; stamens 10, freely inserted upon the calyx rim; anthers basifixed, ellipsoid, 0.75 mm. long, almost as broad; filaments glabrous; style 2 to 3, similar to the stylopodium of *Umbelliferae*, bearing thick subclavate stigmas, the style and stigmatic portion 1.5 mm. in length, persistent; young capsule subglobose, 3-celled, containing many elongated usually curved seeds; pedicel of sterile flower 2 cm. long, slender, glabrous; the petaloid calyx lobes rotate, 3 cm. in diameter; segments 4, nearly free and slightly clawed at the base, creamy white, broadly obovate, entire or occasionally lobulate along the subtruncate apex, equal.

Type specimen 9846, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

A tall tree climber forming tangled bushes and more or less rambling over tree tops on a very steep wooded ravine at 3000 feet near the base of the main precipice of the high-

est peak on its eastern. side. Only two or three plants were seen in this almost inaccessible place. A very rigid species with glands on the under side of the leaves, and fragrant flowers.

ROSACEÆ.

PYGEUM Gaertn.

Pygeum fragrans Elm. n. sp.

Tall tree, 30 m. high, with a straight bole 3 to 6 dm. in diameter; wood quite hard, the bark on the rigid branches smooth and dark brown and covered with lighter brown lenticels. Leaves broadly lanceolate, the average ones 14 cm. long and 4 cm. wide across the middle, the apical portion slenderly tapering toward an acuminate point, base less gradually tapering, lucid green above, paler beneath, entire, subcoriaceous, sparsely strigose on the nerves beneath; petiole glabrous, 1 cm. long, ascending, dark brown; nerves ascendingly curved, 5 to 7 on each side, grabrous in age, dark brown, quite evident beneath, anastomosing at the apex, the reticulations numerous but faint. Inflorescence strict, ascending, racemose, 3 to 5 cm. long, mostly solitary from the axils of fallen leaves; rachis thickened toward the base, short brown pubescent; pedicels scattered along the entire rachis, ascending, strict, subverticellate at the apex of the rachis, more densely pubescent, 5 mm. long; calyx similarly pubescent, campanulate, the broad 2 mm. deep tube easily separating from the basal persistent portion, its truncate margin bearing from 5 to 10 deciduous segments; the largest of them are 2 mm. long, spatulate in shape, more or less pubescent, divaricately spreading, about 5 of which are petaloid; stamens 20 to 30 in more than one series; filaments inserted at the orifice of the calyx tube, glabrous, unequal in length, the longer 7 mm., much interlaced; anthers elliptic, 0.75 mm. long, 0.5 mm. wide, sublaterally attached at the dorsal side; ovary glabrous, one half imbedded in the persistent calyx base; style straight, 6 mm. in lenght, glabrous, subpersistent; fruits hard, dry, black, subglobose and only slightly compressed laterally, 14 mm. high, a trifle wider, 3-celled.

Type specimens for fruit 7662, for flower 7504, *A. D. E. Elmer*, Lucban, Province of Tayabas, May, 1906 and 1907 respectively.

Along wooded ravines at 2500 feet on mount Banahao. The flowers have a strong sweet odor.

It can be distinguished from *P. glandulosum Merr.* by its perfectly glabrous twigs and leaves and longer pedicels. Differs from *P. preslii Merr.* by its very conspicuously raised glands at the leaf base.

RUTACEÆ.

MELICOPE Forst.

Melicope odorata Elm. n. sp.

Small tree, 6 m. high; wood soft, white throughout; bark mottled, brown on the branches, easily pealing. Leaves submembranous, similarly green on both sides, rolled upon the upper side, tips recurved, trifoliate, opposite, mainly along the greenish and glabrous ends of the lax twigs; peduncles nearly 5 cm. long, smooth, terete, grooved on the upper side; blades broadly oblanceolate or lanceolate, 10 to 15 cm. long, 3 to 4 cm. wide above the middle or frequently much smaller and narrower, entire, the acute or acuminate points blunt, gradually tapering toward the base; petiole glabrous, 1 cm. long, also grooved along the upper side, usually thickened at the base; midvein very prominent beneath, smooth; the lateral pairs about 11, rather fine, divaricate, anastomosing, the reticulations fine but quite evident beneath. Inflorescence paniculate, axillary, about 1 dm. long, glabrous; branches divaricate, usually unbranched; pedicels 3 to 5 mm. long, strict, glabrous, subumbellately clustered, subtended by short thick excrescences; calyx glabrous, united at the base, flattened in anthesis, the 4 obtuse segments not exceeding 0.5 mm. in length; petals white, 4, free, oblongish, obtuse, 3 mm. long, 1.25 mm. wide below the middle; stamens 8, inserted below the ovary, opposite the calyx segments and the petals; filaments 3 mm. long, delicate, glabrous; anthers ellipsoid, versatile, at least 0.5 mm. long, nearly as broad; ovary very finely

pubescent, flattened, 1 mm. high, 1.25 mm. broad; style nearly obsolete, bearing a black callous rugose or faintly 3-lobed stigma; capsule pulverulent, 6 mm. broad, flattened, usually parted into three 1-seeded carpels, dehiscent; seeds subglobose, 2 mm. in diameter, shiny, black.

Type specimens 10432 in flowers and 9529 in fruit, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Negros Oriental, Negros, June and March respectively, 1908; also number 9628.

The fruiting specimen was collected in humid woods on a ridge at 3500 feet; the flowering specimens at the Bonyao river falls at 3000 feet. The wood, bark, and flowers possess a very sweet odor. "Ticala-na-ihalas."

Not identical with *M. luzonensis Engl.* Our inflorescence is paniculately branched, not lax as in 732 *Jagor*, nor short and very sparingly branched as in 1819 *Cuming*.

ZANTHOXYLUM Linn.

Zanthoxylum diabolicum Elm. n. sp.

Large spreading tree; stems 6 dm. in diameter, strict, forming a flat top; main branches thick, very crooked, sparingly rebranched; wood soft, odorless, tasteless, yellowish throughout except the thin whitish sapwood; bark smooth, mottled, reddish beneath the epidermis; that on the thick twigs very smooth and green, on the upper side densely covered with hard, grayish brown very sharp pointed spines 6 mm. long, less spinescent along the petioles and peduncles. Leaves alternate, toward the ends of the twigs, heavy, coriaceous, ascending, imparipinnate, very unequal in size, from 3 dm. to nearly 3 m. in length, with 3 to 9 pairs of leaflets; petiole 1 to 3 dm. long, glabrous, glandular punctate, the upper side usually provided with few scattered spines; rachis similar, not spinescent; leaflets 3 to 5 cm. apart, deeply curved upon the upper side, much darker green and lucid on the upper surface, the tips abruptly recurved, glabrous, conspicuously glandular punctate, the normal ones 15 cm. long by 5 cm. wide below the middle, ovately oblong, the apex abruptly acute, the base broadly rounded but the lower one half a few mm. longer, margins minutely involute, sub-

entire or finely crenate, in the sinus of the crenatures beneath provided with large yellowish glands; main nerves about 9 pairs, divaricate, usually alternating with secondary ones, the ends only obscurely united or anastomosing, the reticulations quite evident from both sides; petiole 3 to 5 mm. long, glabrous, easily becoming detached. Inflorescence corymbose, somewhat shorter than the leaves, suberect, heavy, terminal from the upper leaf axils, 1 to 2 or even 3 dm. wide; peduncle green, glabrous, usually spiny toward the base, punctate, stout, subcompressed; secondary peduncle 3 to 12 cm. long, spreading horizontally, occasionally subtended by a foliaceous bract; flowers erect, more or less clustered upon the thick and short pubescent ultimate peduncles, rigid; pedicels nearly as thick as long; calyx simple, very short, glabrous, the 5 thick and triangularly obtuse teeth persistent and more or less united about the base; buds obovoid, its 5 segments valvate; petals alternating, glabrous, caducous, somewhat united at the base, rather rigid, 3 mm. long, one half as wide across the middle, elliptic but with acute ends, tips incurved, nearly purple even in the bud state; stamens alternating, 5, inserted between the ovary and base of the corolla, finally exerted; filaments 3 to 4 mm. long, glabrous, whitish and pink toward the base, usually curved; anthers dorsifixed, broadly ellipsoid, lobed at the base, 1 mm. long, equally as wide ascross the base, yellow; pistil apparently rudimentary; ovary subglabrous, greenish, flattened, 1.5 mm. wide, superior; styles very short and with thick bases, yellowish, 3, bearing small brown stigmas, very similar to the stylopodium of certain *Umbelliferae;* fruit not known.

Type specimen 10217, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

Of this very interesting *Zanthoxylum* only a few large trees were observed in dense humid woods at 4250 feet. It is well known to the Visayan as "Salay." The bark is used by them as medicine for different ailments of the stomach and intestines. When fresh the foliage and flowers have a very strong *Araliaceous* odor. This same odor was very strong when the dry flowers were being dissected.

EVODIA Forst.

Evodia pergamentacea Elm. n. sp.

Stunted tree, 6 m. high; branches rigid and gnarly, with light brown bark; young twigs angular, yellowish tomentose; wood soft, white, light. Leaves parchment-like, subopposite, chiefly crowded at the ends of the twigs, trifoliate; peduncles stout, straight, short pubescent, varying from 2 to 5 cm. long; blades exceedingly variable, the larger ones 12 cm. long by 5 cm. wide above the middle, glabrous except the midnerve and drying brown, beneath much paler when dry and mostly very fine pubescent along the nerves and reticulations, obovate, the apex rounded or only obtuse, base cuneate, entire, the edges strongly recurved or occasionally the whole blade concave below; nerves divaricate, 7 to 11 lateral pairs, prominent beneath, anastomosing, the reticulations also prominent; petioles stout, pubescent, 3 to 5 cm. long. Cymose panicle upon short or elongated pubescent peduncles arising mostly from the upper leaf axils, averaging 1 dm. long; ultimate peduncles as well as the 3 mm. long pedicels similarly pubescent, subtended by minute bracts; calyx pubescent, rigid, rotately spreading when in anthesis, nearly 2 mm. across, united at the base, divided into 4 obtuse segments; petals free, punctate, 4, white, alternating with the calyx teeth, glabrous, 3 mm. long, oblongish acute, the apex subinflexed; stamens 4, alternating with the petals, inserted beneath the ovary; filaments glabrous, filiform, 4 mm. long; anthers versatile, ellipsoid, 1 mm. long; ovary flattened, densely tomentose, superior; style very short, bearing a dark brown subcapitate or only obscurely lobed stigma; fruit not seen.

Type specimen 9504, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

Discovered in the moss laden *Freycinetia* jungles at 5000 feet and higher. Rare, and is known to the native woodsmen and hunters as "Tangulimus".

It is related to *E. reticulata Merr.* and *E. semicarpifolia Merr.*, but is specifically distinct from either.

MICROMELUM Blm.

Micromelum curranii Elm. n. sp.

Shrub, with rather numerous branchlets; wood hard, covered with grayish white mottled bark. Leaves crowded on the young twigs, numerous, alternate, ascending, the peduncle short yellowish pubescent when young but soon becoming glabrous; leaflets alternatingly scattered along therachis, glabrous when mature, unequal in size, ovate to broadly lanceolate, submembranous, entire or obscurely apiculate, apex gradually acuminate, base obliquely rounded to subacute, drying brown, paler beneath, the larger blades 7 cm. long by 2 cm. wide; petiole 3 to 5 mm. long, when young short yellowish pubescent but becoming glabrous; nerves 3 to 5 pairs, ascending, more prominent beneath, reticulations not visible. Corymbose panicle terminal, 6 cm. wide across the top, about as long; peduncles and pedicels strict, suberect, pubescent when in flower, becoming glabrous when in fruit, the latter about 3 to 5 mm. long; calyx truncate or obscurely 5-apiculate, rim like or saucer shaped, pubescent when young, persistent and glabrous in fruiting state; petals 5, ligulate, rather thick, glabrous or sparsely pubescent on the outer side, 4 mm. long, at least 1 mm. wide, apex acute, deciduous; stamens in one series, about 9, inserted upon a prominent disk at the base of the ovary, easily detached; filaments subglabrous, fleshy and more or less flattened, pointed at the apex, subequal in length, the longer ones 4 mm. in length; anther basifixed, broadly cordate or subelliptic, nearly as wide; style thick, 1 mm. long, bearing a terminal subcapitate stigma, easily detached from the ovary; ovary glabrous, oblong in outline or clavate, blunt at apex, base narrowed; immature fruits 1 cm. long, thicker above the middle, prominently punctate, lemon color, its cotyledons folded, dark green.

Type specimen 8530, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

It was found growing in the thickets of limestone sinks of the pine region at 5250 feet. Named for *Mr. H. M. Curran* who first collected it in flower in August, 1906.

It is a form intermediate between *M. tephrocarpum* Turcz. and *M. pubescens* Elm., but can be distinguished from either by its numerous, much smaller and glabrous mature leaves.

SIMARUBACEÆ.

EURYCOMA Jack.

Eurycoma dubia Elm. n. sp.

Large 15 m. high tree; branches widely spreading; stem 9 dm. in diameter, branched from below the middle; sap wood whitish, heart wood yellow, moderately hard, with a peculiar greenish odor and bitter taste; bark gray mottled, whitish beneath the epidermis, that on the twigs dotted with light brown lenticels, quite bitter. Leaves opposite, rather ample toward the ends of the twigs, glabrous, imparipinnate; leaflet smooth, membranous, conduplicate on the upper side, dark green above, glaucescent beneath, 5 to 8 cm. long, 1.5 to 3 cm. wide across the middle, slightly inequilateral, suboblique toward the acute or obtuse base, apex acute or acuminate, the basal margin subentire, otherwise minutely crenate; petiole 5 mm. long, also glabrous, that of the terminal leaflet 1 to 2 cm. long; nerves 5 to 7 on each side, rather obscure on both sides, divaricate. Inflorescence terminal, less than 1 dm. long, corymbosely paniculate, nearly as wide across the top; peduncles usually 3, subglabrous, branched from the middle; pedicels striate, puberulous, 2 mm. long, subtended by minute bracts; calyx puberulous, 5-apiculate, minute; corolla whitish, glabrous, or in the young state slightly hairy on the inner surface; the 5 petals free, at least 3 mm. long, bluntly lanceolate, nerved, rather thick in texture, valvate, alternating with the calyx teeth; staminodes 5, alternating with the petals, somewhat flattened, 1 mm. long, glabrous, bearing a brown colored false anther; ligulate scales apparently absent; ovary superior, 5-celled, 2 ovules in each, obovoid, 3 mm. long, nearly as thick, glabrous; style arising from near the base of the cells, central, erect, 0.5 mm. long; stigma flattened, blackish, nearly 2 mm. across; fruits not known.

Type specimen 10120, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

A few trees of this species were noticed on a thinly wooded ridge at about 3000 feet.

I place this with much doubt under *Eurycoma*, since in this genus the cells are described as having only one ovule, and the staminate flowers bearing ligulate scales. Indeed, I am not quite sure as to the family. It has not the glandular or punctate foliage of *Rutaceæ*.

BURSERACEÆ.

CANARIUM Linn.

Canarium nervosum Elm. n. sp.

Tree, 8 m. high; branches few, very thick, densely marked with leaf scars. Leaves spreading and crowded toward the ends of the suberect branchlets, 1 m. long or less, bearing 9 to 14 pairs of leaflets, strongly recurved and conduplicate on the upper shining dark green side, paler beneath, glabrous, chartaceous, the medium ones 2 dm. long, 8 cm. wide, ovately oblong, the entire magins subinvolute, apex acute to abruptly acuminate, base emarginately rounded or subcordate; petiolules glabrous, stout, 1 cm. long; nerves very prominent beneath, lateral pairs about 20, glabrous, more numerous toward the base, divaricate, tips strongly curved and obscurely united, the numerous reticulations very conspicuous on both sides. Infrutescence solitary from the leaf axil, heavy and subpendulous, at least 3 dm. long, fruit bearing from near the base; the upper fruits sessile, the lower ones upon 5 cm. long ultimately glabrous peduncles; pedicels 1 cm. long, very thick, cinnamon brown pulverulent, bearing the persistent bracts; bracts 3, united below the middle, triangularly obtuse, 5 mm. long, similarly pulverulent; fruits when young covered with brown setose hairs, when mature entirely glabrous, glaucous green, 3 cm. long, triangular, both ends similarly rounded, elliptic in outline; flowers not seen.

Type specimen 7242, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

Discovered on a light wooded and dry, well drained ridge at 1000 feet. Again collected in the Cuernos mountains on a pre-

cipitous bluff along the Bonyao river at 1500 feet. Number 10341.

From *C. bersamifolium Perk.* and *C. radlkoferi Perk.* it differs in having much larger and fewer leaflets; from *C. ahernianum Merr.* in having glabrous leaves.

DICHAPETALACEÆ.

DICHAPETALUM Dup. Th.

Dichapetalum glabrum Elm. n. sp.

Shrub, 3 m. high; bark of the slender twigs smooth, brown, dotted with lenticels, the younger portions strigose brown pubescent. Leaves alternate, flat, submembranous, entire, about 1 dm. long, 3 cm. wide across the middle, oblong, blunt apex obtuse to acute, the base obtuse and inequilateral or suboblique, glabrous on both sides except the nerves; petiole 5 mm. long, yellowish brown strigose; stipule laciniate, usually shorter than the petiole, similarly pubescent, deciduous; nerves strigose, especially beneath, becoming glabrous with age, 5 to 7 lateral pairs, ascendingly curved. Fruits axillary, 15 mm. high, fully as wide across the top, 2 to 3-celled, 1 seed in each, covered with a short yellowish gray tomentum at the base subtended by a 5-segmented calyx; flowers not seen.

Type specimen 7275, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

A lax undershrub in the hill forest at 1000 feet.

Very similar indeed to *D. tricapsulare (Blm.) Merr.* which has narrower soft pubescent leaves and larger capsules.

Dichapetalum obovatum Elm. n. sp.

A small tree like shrub, 4 m. high; wood soft, reddish, covered with smooth yellowish brown bark. Leaves subcoriaceous, with recurved tips, dull green above, glaucous or whitish green beneath, attenuate, chiefly at the ends of the brown tomentose younger twigs, flat, horizontally spreading, obovate, the medium sized ones 12 cm. long, 5.5 cm. wide across the middle or slightly above this, apex abruptly short acute, base cuneate, margins entire and somewhat

involute, glabrous above, pubescent beneath especially on the nerves and reticulations, persistent; petiole 0.5 to 1 cm. in length, densely ferruginous pubescent but becoming glabrous with age and more or less scurfy, the basal one half very thick; nerves very prominent beneath, the midvein and the primary lateral ones dark brown, about 9 to 12 primary ones on each side, oblique, rather strict, their tips arched and united, reticulations numerous, very evident. Young infrutescence terminal, 2 to 5 cm. long, densely reddish brown pubescent; peduncle strict, comparatively thick, terminated by a single young fruit; its bracts triangularly obtuse or acute, similarly pubescent on the outer sides, glabrous on the inner surface, stiff, brown; fruit sessile, its base substipitate, oblique or laterally compressed, 1 cm. high, about as wide, apex truncate and with an apiculate style, 2-celled, 1 seed in each cell, densely covered with a maroon velvety pubescence; stigma several sulcate or with several very short lobes which are glabrous; calyx subpersistent, of about 5 segments, the lobes triangular and 4 mm. in length.

Type specimen 7931, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

Very rare, and an undershrub of deep woods at 2400 feet on mount Banahao.

EUPHORBIACEÆ.

ELATERIOSPERMUM Blm.

Elateriospermum paucinervia Elm. n. sp.

A round topped tree, 6 m. high, with hard wood; ultimate branches rather numerous and quite rigid, with glabrous smooth brown bark. Leaves subopposed, never verticellate, glabrous, coriaceous, obovate, quite unequal in size, chartaceous, darker shining green on the upper side, the margins entire and subinvolute, the apex rounded and terminated by a short obtuse point, base cuneate, the larger blades 15 cm. long, about one half that in width above the middle; petiole 3 cm. long, suberect, glabrous, terete, swollen and usually curved at the top, articulate at the base; veins ascendingly

curved, 3 to 5-nerved on each side, quite prominent beneath, cross bars faint, the main nerves arching and connected below the margin; fruits hard, green, smooth, turning leathery brown when dry, solitary or in pairs from the leaf axils; triangularly ellipsoid, 3 cm. long, 2.5 cm. in diameter, loculicidally dehiscing ultimately, the carpels 2 to 3 mm. thick, 3-celled, its partitions dry and comparatively thin, more or less thickened at the apex; seeds solitary in each cell, pendulous from a short thick persistent point, triangularly obovoid, 1.5 cm. long, smooth; peduncles 2 to 3 cm. long, persistent, woody, conspicuously thickened toward the apex.

Type specimen 7416, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906.

Only one tree was found in sparse woods on the edge of a ravine bordering a grassy glen, at 2250 feet.

This is a small genus of only one or two Javan species and has not been reported previously from our islands.

SAPIUM R. Br.

Sapium crassifolium Elm. n. sp.

Stunted tree or tree like shrub, 5 m. high, the main ascending branches arising from below the middle, the twigs smooth, slender; wood moderately hard, dull white or nearly brown towards the center; bark gray, scaling in plates. Leaves very coriaceous, glabrous, descending, lucid on both sides, somewhat paler green beneath, conduplicate on tie upper side, quite variable, oblongish obovate, the average ones 1 dm. in length, 5 cm. in width, entire, apex rounded and abruptly tapering into a short acute point, gradually narrowed toward the obtuse base; nerves ascendingly curved, 5 to 7 pairs, the ends anastomosing, quite prominent on both sides, reticulations also prominent; petiole 5 to 8 mm. long, subglabrous, stout, grooved along the upper side. Inflorescence terminating short lateral branchlets or occasionally axillary, 1 to 3-clustered; the spikes rather early falling, usually united near the base when there are 2 or 3, strict, from 5 to 10 cm. long, short yellowish pubescent; flowers odorless, sessile, solitary or loosely grouped along the spike, reddish brown, each individual sub-

tended by a ciliate obovate 1 mm. long bract; calyx shallow cup-shaped, 1 mm. deep, 2 mm. wide, entire, ciliate pubescent along the inner side of the rim; disk much flattened, pubescent on the upper side, the central portion occasionally protruded and nipple shaped; stamens 3, strictly divaricate glabrous; anthers basifixed, 0.5 mm. high, 0.75 mm. wide, conspicuously divergent, brown purplish, opening from the apex down the edge toward the base; pistillate and fruiting specimens not found.

Type specimen 10312, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

Only a few shrubby trees were observed in an open rocky place of a grass ridge at 1000 feet.

The round subentire calyx clearly place it with *Sapium*.

CLAYOXYLON A. Juss.

Clayoxylon arboreum Elm. n. sp.

Erect tree, 5 m. high or higher, with a broad roundly spreading crown; branchlets not numerous, quite thick, watery, suppendulous. Leaves crowded at the ends, somewhat succulent, broadly oblanceolate, the average blades 3 dm. long, 13 cm. wide above the middle, glabrous, shining green above, duller and lighter green beneath, apex acute, base attenuate, margins crenately serrate, the callous apices usually next the sinus, frequently subentire especially toward the base, the basal upper surface with a pair of large knob like glands; nerves oblique and nearly straight, conspicuous beneath, 7 to 9 on each side, reticulations coarse, less prominent; petiole about 8 cm. long, stout, puberulent, deciduous. Inflorescence axillary, upon 1 to 2 spicate racemes, short yellowish gray pubescent; flowers deflexed, in small clusters, irregularly arranged along the entire length of the rachis; pedicels of the flowers 2 to 3 mm. long and similarly pubescent, of the capsules twice as long and nearly glabrous; ovary ellipsoid, also pubescent; styles 1 mm. in length or somewhat less, divaricately 3-parted; capsules 3-lobed, truncate at apex, cuneate at base, 3-celled, glabrous and smooth, septicidally dehiscent;

seeds 1 in each cell, 2.5 mm. in diameter, globose, black, smooth, conspicuously wrinkled.

Type specimen 7335, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

At once distinguished from *C. indicum Linn.* by its glabrous not grooved capsules. Neither must it be confused with the narrow leaved scandent species, *C. elangatum Merr.*

ANTIDESMA Linn.

Antidesma microcarpum Elm. n. sp.

Slender, 3 to 5 m. high shrub, with rather soft whitish wood and smoothish gray or mottled bark; branches lax, reclining, smooth, whitish toward the ends. Leaves subchartaceous or submembranous, alternatingly scattered, lucid dark green above and usually conduplicate, with recurved tips, descending, lighter green beneath, glabrous, entire, gradually tapering into an acute to acuminate rather blunt apex, 10 cm. long, 5 cm. wide across the middle, but frequently larger or much smaller, ovately oblong, base mostly rounded, occasionally inequilateral; petiole about 1 to 2 cm. long, glabrous, swollen and grayish white both at the apex and the base on the under side, caniculate on the upper side; bud bracts 3 mm. long, acuminate, yellowish pubescent; midvein very prominent beneath, terminating the apex, the lateral 5 to 7 pairs much ascending and anastomosing, the numerous reticulations conspicuous beneath. Infrutescence terminal, axillary or lateral, few branched, not exceeding 5 cm. in length; branchlets strict, ascending, averaging 3 cm. in length, green, covered with short yellowish hairs; subpersistent calyx sessile or short pedicellate, subtended by solitary puberulent and persistent bracts, turbinate, 1 mm. long, 1.5 mm. wide across the ciliate rim; drupe subglobose, subsessile, pale white, pink and finally turning to a dull ashy gray or blue, 2.5 mm. in diameter, bearing a subsessile terminal 4-cleft pistil; stone solitary, divided longitudinally by a ridge.

Type specimen 9668, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

Rare. Discovered on a wooded cliff along the Bonyao

river at 2750 feet. The fruit is sour and the plant is called by the Visayan "Tagobinlod." Also collected by *Mrs. Clemens* in the lake Lanao region of central Mindanao.

TRACHELOSPERMUM Lem.

Trachelospermum philippinense Elm. n. sp.

Scandent and forming bushes; stems 2.5 cm. thick, crooked, terete, quite flexible and more or less twining; wood soft, porous; bark brown and gray mottled, lenticelled, with sticky milky sap; numerous branchlets short, crooked and wiry. Leaves coriaceous, dark shining green, descending, subelliptic to obovate, opposite, glabrous, apex with blunt obtuse point, the base attenuate or short cuneate, the average larger blades 8 cm. long by 5 cm. wide; the nerves rather faint, from 5 to 7 pairs, oblique, anastomosing, the numerous reticulations comparatively conspicuous; petiole 1 to 2 cm. long, glabrous, deciduous. Inflorescence terminal or subterminal, suberect, paniculately elongated, 1 to 2 dm. long, upon 5 cm. long glabrous peduncles; main branches dichotemous, ultimately trichotemous, short rusty brown pubescent, the ultimate ones rather short and subtended by 2 mm. long obtuse bracts which are covered with a similar pubescence; pedicels stout, about 2 mm. in length, also pubescent; calyx equal in length, rigid, densely covered on the exterior with short ferruginous hairs; the 5 erect segments united at the base, quite thick in texture, obtusely triangular, 1.5 mm. long, equally as wide across the base; corolla tube 6 mm. long, glabrous, constricted below the middle, above the middle inflated; corolla lobes 5, slightly twisted to the right in the bud but reflexed to the left in anthesis, overlapping, 2.5 mm. long, the right one half again as long as the left side, apices rounded; stamens 5, included, sessile; their filaments adnate to the corolla tube; anthers lanceolate, introrse, united about the stigma, terminated by an acuminate 1 mm. long point; style at least 2 mm. long, glabrous, with a crooked bend above the middle, bearing a terminal broadened bifid stigma, separated toward the base; ovary ovoid, bristly pubescent, 1 mm. long, divided into 2 plano-convex parts, its base surrounded by a glabrous band of connected scales 0.75 mm. in height.

Type specimen 9135, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

Rare. In light woods filled with shrubberies bordering grassy glens at 2500 feet of mount Banahao.

Near to *T. fragrans Hook. f.* but not fragrant, with a differently branched inflorescence, and the ovary not at all glabrous. Fruiting specimens were collected in 1902 by *Sr. R. S. Garcia*, at Dalupaon, (Pasacao) province of Camarines Sur, Luzon; and by the late *H. D. Everett* in 1906, province of Occidental Negros, Negros (Forestry Bureau 4250).

GLYCOSMIS Corr.

Glycosmis angularis Elm. n. sp.

Lax shrub, 2 m. high; branches more or less crooked and gnarly, tough. Leaves always simple, alternate, lanceolate or frequently oblong, membranous, flat, much varying in size, the normal ones 10 cm. long, 4 cm. wide, glabrous and punctate on both sides, apex acute, or short acuminate, shining dark green above, base mostly acute, faint nerves 5 to 7 on each side and forked toward the distal ends, horizontally spreading, with a 5 mm. long glabrous petiole. Infrutescence upon short sparingly branched peduncles provided with thick cinnamon brown bracts or simply zigzag and with obsolete bracts; pedicels of fruits only 1 to 2 mm. long, usually short brown pubescent, subtended by minute 3 to 5 bracts; persistent calyx of 5 acute 1 mm. long sepals; mature fruits soft, flesh color, 1 to 2 cm. long, less than 1 cm. in diameter at the middle, oblong, nearly equally tapering at both ends, characteristically 5-angled throughout its development, 2-celled; each cell with a solitary plano-convex hard seed.

Type specimen 7273, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

Along streams and upon cliffs at 500 feet elevation.

Similar to *G. citrifolia Lindl.* which is considered by some botanists as *G. pentaphylla Corr.*, but leaves in our specimen all alternate, berry not globular but strongly angled and tapering toward both ends, especially toward the apex.

STAPHYLEACEÆ.

TURPINIA Vent.

Turpinia ovalifolia Elm. n. sp.

Tree, 8 m. high or higher, with a straight 3 dm. thick trunk; ultimate limbs spreading, rather short and gnarly; wood whitish, moderately hard, covered with thick deeply checked bark. Leaves opposite, usually from 2 to 3 pairs toward the ends of the twigs, glabrous, subcoriaceous, conduplicate on the upper side or frequently nearly flat, with recurved tips, lucid dark green above, much paler beneath, leaflets 5 to 7, elliptic to rotund, apex round and with an abrupt acute point, base equally rounded, margins entire or only obscurely crenate with fine whitish callous points, the average ones 5 by 7 cm.; petiole 1 cm. long, glabrous, caniculate on the upper side, deciduous; nerves equally plain on both sides, 3 to 5 pairs, ascendingly arched, reticulations minute and obscure. Infrutescence terminal or subterminal, suberect, about equalling the foliage, ternately branched from the base, paniculate, glabrous. Flowers creamy white, upon 3 mm. long comparatively thick gabrous pedicels which are subtended by a pair of short acute bracteoles; calyx glabrous, campanulate or cup shaped, the basal one third united, the 5 lobes oblong and truncately rounden, 4 mm. long, 2 mm. wide; petals free, thinner, narrowly obovate, at least as long as the calyx segments, alternating; stamens of an equal number, not exerted, glabrous, strict, free, 3 mm. long; the filaments rather thick but with a finely pointed apex; anthers versatile, 0.75 mm. long, at least that in width; ovary glabrous; style 2 mm. long, gradually tapering to the apex, confluent but separating with age into 3; stigma subcapitate; fruits subglobose or obovoid, 1 to 1.5 cm. thick, the apex usually provided with 3 distant mucronate points which are more or less connected wit reticulations, hard, green, 3-celled, each cell apparently only 1-seeded.

Type specimen 8088, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

Occasionally met in woods at 2500 feet of mount Banahao. The author has also collected it at 7000 feet on mount Santo-Tomas, province of Benguet, Luzon.

This alpine species stands near to *T. nepalensis Walp.* which *Bentham* reports common on the island of Hongkong, and that it extends over the hilly districts of India and eastern tropical Asia. Both in *King's* Mat. Fl. May. Penin. 453, 1893-6; and in *Hooker's* Fl. Brit. Ind. 1; 699, 1875, *Walpers'* species is considered a form of *T. pomifera DC.*

ICACINACEÆ.

URANDRA Thw.

Urandra fuliginea Elm. n. sp.

Shrubs or small trees; ultimate branches covered with a dense felt like brown pubescence. Leaves alternate, flat, subcoriaceous, scattered along the terminal twigs, ascending, about 1 cm. long, 4 cm. wide, glabrous above, evenly covered with a short fuliginously colored pubescence beneath, margins minutely involute, oblanceolate to obovate, apex abruptly acute, the lower one half gradually tapering toward the acute base; nerves usually 2 to 3 on each side, much ascending, arising below the middle; petiole 6 mm. long, similarly pubescent. Flowers not seen; infrutescence on 1 cm. long persistent and pubescent peduncles, arranged along the twigs immediately below the leaves or frequently in the lower leaf axils; pedicels 2 to 3 from each peduncle, 3 mm. long, also pubescent and persistent; rim like calyx persistent on the fruits; nut 2 cm. long, 14 mm. in diameter, broadly fusiform to narrowly elliptic, rugulose, smooth, exocarp thin, endocarp very tough and strengthened by woody vertical ridges, 1-celled and apparently with only 1 drupe; stigma 2 to 3 mm. in diameter, sessile, wart like, with an opening leading from the central cavity down toward the side on which the seed is attached.

Type specimen 8620, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

Not having flowering specimens there is some question as to it being *Urandra* or *Platea;* however, the withered persistent and apparently united calyx led me to consider it under the former genus.

SABIACEÆ.

MELIOSMA Blm.

Meliosma sylvatica Elm. n. sp.

Rather slender shrubs, 5 m. high, suberect, with thick sparsely branched branchlets; wood white, soft, easily breaking; bark smooth, gray and brown mottled. Leaves 3 to 5 dm. long; at the apex of the branchlets only, imparipinnate, submembranous, lucid green above, reddish beneath, with recurved tips, glabrous or with strigose brown hairs, 9 to 15 leaflets which are subopposed, the basal ones somewhat smaller and ovate, the middle ones oblong, the terminal ones largest and obovate, the lower one half of the margin entire, that portion toward the apex serrately apiculate, apex abruptly acute, base obliquely obtuse or subcuneate, the average blade 15 cm. long by 5 cm. wide; petiole less than 1 cm. long, ferruginously hirsute as is also the entire rachis, peduncle, and young apical portions of the twigs, thickened toward the base, the terminal much longer and slenderer; nerves prominent especially beneath, oblique, the dark brown reticulations also prominent. Inflorescence paniculate, terminal, 3 to 6 dm. long, about 3 dm. wide across the base; branches puberulent; pedicels 1 to 3 mm. in length, persistent to the fruits; calyx glabrous, brown and persistent, submembranous, spreading or reflexed in young fruits, obscurely united at the base, 4-segmented, the obscurely rounded lobes 1.5 mm. long; fruits 8 mm. long, bluntly rounded at both ends, keeled, conspicuously reticulate on the sides, smooth, hard, reddish in the fresh state, nearly black when dry.

Type specimen 9132, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

A slender undershrub of dense woods at 2500 feet on mount Banahao.

Probably it is only an intermediate form between *M. luzonica Merr.* and *M.* ~~too large~~ *multiflora Merr.* Number 8819 *Elmer* from Baguio is not typical *M. multiflora Merr.*, and our specimen mainly differs from his species in its less coriaceous and reticulate leaves, and in its shrubby size. Neither can it be referred to the former species. Both the Benguet species are stocky trees. Our species is always a sparsely branched slender undershrub.

VITACEÆ.

CISSUS Linn.

Cissus suberosa Elm. n. sp.

Scandent; stems flexible, 1 5 cm. long; its wood porous, soft, odorless; bark brown, or when old covered with soft corky grayish excrescences. Leaves alternate, scattered, easily breaking, subcoriaceous, trifoliate; petiole suberect, rugosely thickened and much twisted or curved at the base, glabrous, strict, sprinkled with whitish lenticels, 3 to 8 cm. long; petiolule 3 to 5 mm. long, the terminal one twice as long; blade recurved, dark green above, yellowish green beneath, glabrous, the terminal one symmetrical and usually larger, the lateral ones have the lower side broader, lanceolate, apex acuminate in all, the base of the terminal leaflet cuneate, that of the lateral ones obtusely rounded, with minute serratures except around the base; nerves 5 to 7 pairs, ascendingly curved, the tips anastomosing, the reticulations obscure. Infrutescence dichotemously branched, 8 to 15 cm. long and fully as wide; peduncles very short, stout, solitary or several from the same leaf axils or clustered along the twigs; branches subtended by minute bracts especially toward the base, short rusty brown puberulent, the ultimate ones subumbellate; pedicels at least 5 mm. long, strict; fruit green, turning light red and when fully ripe becoming very dark purple or nearly black, mealy and rather sweet, glabrous, subglobose or obscurely obovoid, 7 mm. thick; seeds 3, unequal in size, 5 mm. long, obovately triquetrious, apex shallowly emarginate, base pointed, ventral sides plane, back and occasionally the lateral edges rugolose, brown, stony.

Type specimen 9500, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, province of Negros Oriental, Negros, March, 1908.

This looping climber was only once seen in damp moss-covered woods at 4500 feet, on the north side of the lesser peak.

In September to October of 1906, *Mrs. Clemens* apparently collected this same species in flower at lake Lanao, central Mindanao. The inflorescence of her specimens is entirely covered with a yellowish gray puberulence. Flowers 2 mm. long, the outer lower portion sparsely bracteolate; corolla 4-apiculate; ovules also 4.

LEEA Linn.

Leea negrosense Elm. n. sp.

A 3 m. high shrub; stems 3 cm. thick, yellowish brown, lenticelled, sparingly branched. Leaves large, ample, horizontally spreading; peduncle stout, glabrous, terete, about 2 cm. long, forked at the nodulose and subarticulate lower joint into 3 large divisions; secondary peduncles less than 1 cm. long; leaflets opposite, imparipinnate, 3 to 5 pairs, averaging 8 cm. apart, the lower pair trifoliate; petiole 1 to 2 cm. long; the petiolule at least twice as long, glabrous, grooved or fluted along the upper side; blades rather thin, glabrous, elliptic, ovately lanceolate or occasionally lanceolate, subentire toward the base, apiculate or serrately dentate along the sides and toward the slender acuminate apex, the teeth callous pointed, base mostly obtuse, the normal ones 15 cm. long by 5 cm. wide below the middle, the terminal one usually the largest; nerves plain from the upper side, reddish brown and prominent beneath, pinnate, 7 to 11 lateral pairs, ascending; tips obscurely united, glabrous or strigose when young, the fine reticulations quite evident beneath. Inflorescence deep red, terminal or from the uppermost leaf axil, upon rather short but thick peduncles, corymbosely branched, 2 to 3 dm. wide or even wider; all the branches subangulate or subcompressed, lenticelled, the younger portions short brown pubescent; pedicels 2 to 3 mm. long, puberulent, subtended at the base by vestiges of bracts; calyx glabrous, 3 mm. high, cupshaped, united below the middle, the 5 broad teeth quite thick and rigid; the 5 corolla segments also thick, valvate, glabrous, oblongish, connate toward the base, 4 mm. long; staminal rim inserted upon the base of the corolla, thick, glabrous, terminated into 5 blunt or emarginate appendages; stamens 5, alternating with the appendages of the staminal rim; filaments glabrous, 1 mm. long, flattened and widest at the base, inserted on the basal outer side of the staminal rim; anthers inflexed in the bud, acute at the apex, 1 mm. long, ellipsoid, dorsifixed; ovary glabrous, conical, 5-ovulate; style strict, 1 mm. long, glabrous, bearing a minute terminal stigma; fruit not seen.

Type specimen 10174, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

Inhabiting deep wooded ravines of the Bonyao river from 2000 to 3000 feet.

Would be referred to *L. javanica Blm.* were it not for the glabrous leaves and ample red inflorescence. *L. sundaica Miq.* has red flowers and is the same as *Blume's L. robusta* which is described as having congested corymbs and leaves scabrous beneath.

TILIACEÆ.

HALCONIA Merr.

Halconia negrosensis Elm. n. sp.

Erect tree, 15 m. high; stems usually somewhat crooked, 5 dm. in diameter; wood white throughout, easily cutting, odorless; bark grayish, mottled, minutely checked longitudinally and roughened with flat lenticels, reddish beneath the epidermis; branches rather widely branching, yellowish scurfy on the younger portions. Leaves flat, ascending along the twigs, coriaceous, deep dull green above, whitish beneath, the average blades 10 cm. long, 5 cm. wide, oblong, equally rounded at both ends, margins subentire or minutely serrately toothed, sprinkled on both sides with tuftlets of yellowish ciliate peltate hair like scales, otherwise glabrous on the upper side except the scurfy veins, beneath with a dense lepidote matrix, alternate; petiole about 2 cm. long, stout, scurfy; nerves prominent beneath, 4 to 7 pairs, tips obscurely united, the basal pair very oblique, strict. Cymes greenish, terminal and from the uppermost leaf axils, not much exceeding 10 cm. in length and 6 cm. across the top; stout peduncle varying in length, 7 cm. long, yellowish scurfy, occasionally subtended at the base by a short blunt thick scale; secondary peduncles terminated by small clusters of 3 to 5 flowers subtended by an involucre; pedicels 4 to 7 mm. long in the fruiting state, ciliate; involucral bracts 8 mm. long, spreading, somewhat paler green and even grayish on the outside, 5 to 7 in number, unequal in width, the broader one frequently

toothed or lobed, united at the very base, lanceolate to oblongish; calyx segments 4, deciduous, oblong, very coriaceous, spreading, densely stellate pubescent on both sides, the entire margins somewhat curved upon the upper side, oblong, obtuse at apex, 15 mm. long, 6 mm. wide above the middle, nearly free at the base, persistent, often with a tinge of red; petals free and alternating with the sepals, pale pink or whitish, linear, 12 mm. long, 3 mm. wide, apex obtuse, reflexed from the callous suberect pubescent basal portion, subglabrous on the upper surface, yellowish pubescent beneath, inserted upon the basal upper portion of the calyx; stamens numerous, subequal, erect, inserted upon the basal portion of the superior ovary; filaments glabrous, filiform, whitish, the longer ones 6 mm.; anthers brown, versatile, ellipsoid, nearly 1 mm. in length, persistent and strongly recurved, shedding an abundance of yellow pollen prior to the spreading open of the calyx and corolla segments; ovary 2-celled, numerously ovuled, densely covered with yellowish tuftlets of ciliate hairs; capsule flattened at right angle to the dissepiment, suborbicular from the side view, lenticular from the edge, 2 cm. wide, a few less mm. in the height, apex more or less truncate and terminated by a minute point, densely and persistently covered with a short ciliate matrix, or felt like in appearance and sprinkled with tuftlets of deciduous long ciliate hairs, smooth and grayish on the inside; seeds dry, lenticular, dull brown, attached to the toothed or pectinate thick membranous receptacle, 2 mm. in diameter, nearly plane and obscurely rugose on the side turned to the placentae, very convex and nearly smooth on the opposite side, the edges densely provided with persistent brownish 3 mm. long hairs.

Type specimen 9649 for flower and 10358 for fruit, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, province of Negros Oriental, Negros, March and June respectively, 1908.

On ridges at 2500 to 3500 feet, scattered in the woods of the lower fog limit throughout this region. The fruit and seeds are exactly as *Trichospermum mindanaense Merr.* described from *Mrs. Clemen's* collection of lake Lanao, central Mindanao. The involucre and the 4-merous flowers alone place our specimens

with *Halconia.* Number 9649 has flowers nearly twice as large as *H. involucrata Merr.*

The natives call it "Langosig-dako."

STERCULIACEÆ.

STERCULIA Linn.

Sterculia multistipularis Elm. n. sp.

Slender erect tree, 7 m. high; branches also slender, divaricate, gray, smooth or the tips of the 6 mm. thick twigs short ferruginous pubescent. Leaves usually crowded toward the ends of the twigs, flat, semirigid, with slightly recurved tips, lanceolate to narrowly oblong, quite variable, rounded bases, apex obtuse but more commonly acute to acuminate, the normal ones 16 cm. long and 4 cm. wide, glabrous above except a few ciliate hairs along the caniculate midrib toward the base; nerves beneath very prominent, 9 to 11 on each side, ascending, minutely pubescent at least on the nerves and prominent reticulations, and more or less glandular; stipule comparatively thick, densely ferruginous or yellowish brown pubescent, with age becoming glabrate, 1 to 2 cm. long, 1.5 mm. wide at the base, easily detached, densely clothing the twigs, setaceously acuminate. Inflorescence axillary, somewhat viscid, about 14 cm. long, subpendulous, paniculate, brown pubescent; pedicels single or branched, very slender, 1 to 3 cm. long, mostly without minute subtending bracts, flexuose; calyx 10 mm. long, the slender acuminate segments 7 mm. long, fifth segment equal or frequently much shorter, deep purple on the interior, the united basal portion urn shaped, with a small knob like thickening and extended into a slender pedicel, sparsely brown pubescent on the outside, with denser lighter brown or gray pubescence on the inner side of the lobes; filaments glabrous, united at first but becoming shreddy, bearing a capitate cluster of irregularly disposed 0.75 mm. long anthers; pistil columnar, also glabrous.

Type specimen 8525, *A. D. E. Elmer*, Baguio, province of Benguet, Luzon, March, 1907.

In dry ravines of the Ipit river canyon at 4000 feet.

It is distinguished from *S. obovata Merr.* by its axillary inflorescence, differently shaped leaves, much longer bracts, and different perianths; from *S. stipularis R. Br.*, its nearest ally, by its much less tomentose inflorescence and more numerous persistent bracts.

DILLENIACEÆ.

SAURAUIA Willd.

Saurauia avellana Elm. n. sp.

Shrub, 3 to 5 m. high; wood soft, whitish, covered with gray and rather smooth bark; twigs sparse, quite rigid, the younger portions rugose and scurfy, hollow. Leaves alternate or subopposite, rigid and heavy, flat, spreading, glabrous on the upper side or in the young state covered with a fine reddish brown tomentum, densely covered beneath with an avellaneus colored tomentum, exceedingly variable in size, oblong to subelliptic, the normal blades nearly 2 dm. long, 8 cm. wide across the middle or a trifle above it, the margins provided with callous serratures, apex rounded or obtuse, base also rounded; petiole 1 to 3 cm. long, stout, usually scaly; nerves pinnate, prominent beneath, 13 to 17 pairs, tips strongly arched, united or anastomosing, covered with an avellaneus colored tomentum, the stout midrib and the larger lateral nerves also provided with adpressed scales, the cross bars and reticulations prominent. Inflorescence axillary; peduncles strict, scurfy, 1 to 5 cm. long, sparingly branched from the middle or above the middle, usually few from the same leaf axil; pedicels scaly, 3 to 5 mm. long, strict, occasionally subumbellately clustered, subtended by scale like bracts; calyx similarly scaly upon the exposed outer sides, 5 mm. long, the 5 segments barely united at the base, the inner or overlapping sides glabrous, oblong or ovate, obtuse at apex, unequal in size; corolla snow white, somewhat exceeding the calyx, united at the base, glabrous, oblong to broadly obovate, thin, early falling; stamens numerous, inserted upon the base of the corolla; filaments slender, glabrous, 1 mm. long; anther 0.75 mm. long, elliptic but with truncate ends, dorsifixed; styles also glabrous, 3 mm. long, connate

at the base, terminal, bearing a small capitate stigma; ovary superior, glabrous, 3-celled, each cell many ovulate; ripe fruit not seen.

Type specimen 10055, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

This splendid species was not uncommon in thicketed or lightly wooded ridges at 3000 feet. The color of the under side of the leaves is very characteristic and gives the shrub a neat appearance.

Saurauia negrosensis Elm. n. sp.

Shrub 3 to 5 m. high; wood white, covered with gray bark; young twigs rough with dirty colored scales. Leaves subcoriaceous, drying brown especially on the upper darker green glabrous side, nearly flat and subhorizontally spreading, oblanceolate to obovate, entire but with scattered spicules, apex acute, cuneate toward the base, an average blade 18 cm. long by 6 cm. wide above the middle though quite variable in size, alternatingly scattered toward the twig ends; petiole 1.5 cm. long, dirty brown, scurfy; nerves rather conspicuous beneath, ascending, the tips anastomosing and strongly curved, 9 to 13 lateral pairs, reticulations obscure and faint, the larger nerves provided with scattered scales. Flowers 1 to 3-clustered from the leaf axils or from the axils of fallen leaves; pedicels green, not exceeding the petioles, scale covered, at the base usually subtended by minute scale like bracteoles; calyx whitish with pink tips, turning green with age, persistent, subrotund or broadly elliptic, 5, the outer ones thicker and brown scaly on the back, the inner ones membranous and glabrous; corolla pure white, 5, united at the base, oblong to obovate in outline, the truncate apex obscurely and irregularly lobulate, glabrous; stamens about 20, freely inserted between the base of the corolla and the ovary; filaments yellowish white, 2 mm. long, rigid, glabrous, subcompressed, subequal; anther 2 mm. long, oblong, with truncate ends, dorsifixed; pistils 3, glabrous, free or connate at the very base, 3 mm. long, persistent, bearing minute capitate stigmas; fruit subglobose, glabrous, 3-celled, num-

erous seeds in each cell; seeds attached to the central placenta, brown, oblongish truncate, less than 1 mm. long.

Type specimen 10139, *A. D. E. Elmer*, Dumaguete, Province of Negros Oriental, Negros, May, 1908.

Collected on a steep slope of a humid ravine near some minor cataracts of the Bonyao river at 1500 feet.

Undoubtedly related to 1712 *Cuming* from Samar and which *Dr. Stapf* in Trans. Linn. Soc. Lond. 4, 134 considers *S. ferox Korth.*, but our leaves are much less pubescent and the calyx not at all bristly hairy nor scaly.

THEACEÆ.

GORDONIA Ell.

Gordonia welborni Elm. n. sp.

Large tree, 30 to 50 m. high; trunk rather straight, 1 m. thick; wood hard, somewhat burly, the whitish sapwood portion comparatively thin, the balance reddish, with a faint sweet sappy odor; bark thick, scaling in plates, grayish, conspicuously red beneath the epidermis; branches spreading, the ultimate ones quite short, crooked, rigid, and forming more or less bushes. Leaves descendingly recurved, stiff, dark green on the upper side, lighter beneath, smooth on both sides, obovate, very unequal in size, alternate, the larger ones 15 cm. long, about one half as wide above the middle, entire or obscurely crenate toward the apex, abruptly obtuse or acute at the apex, base slenderly cuneate; petiole stout, usually less than 5 mm. long, turning reddish, glabrous; midvein very prominent beneath, reddish; the lateral ones obscure, ascending, coarsely anastomosing toward the ends, about 11 pairs; bud scale 2 cm. long, short yellowish gray pubescent on the outer side, involute, long acuminate. Flowers 1 to 3-clustered at the ends of the branchlets or the lowermost one from leaf axils; pedicel not exceeding 1 cm. long, about 4 mm. thick; flower buds globose; the 5 imbricate calyx segments spreading in anthesis, unequal in size, broadly rotund, short yellowish gray pubescent on the outer side, smooth and brown on the inner, green at the base and reddish toward the apex in the fresh state, the entire margin ultimately becoming crenately lobed or split,

inserted upon a thick ligneous base, the larger ones 12 mm. across; petals 3 to 4 cm. long, obovate, 5, rotately spreading in flower, light creamy white, united at the very base, deciduous as a whole, short but densely yellowish pubescent throughout the middle basal portion of both sides, apex rounded or subtruncate; stamens many, 15 mm. long, some a trifle shorter, united at the base and inserted upon the basal portion of the corolla; filament short pubescent toward the base, yellowish, otherwise glabrous and glandularly dotted; anthers very light yellow, glabrous, 2.5 mm. long, 1.5 mm. wide below the middle, ovately ellipsoid, bilobed at the base, attached in the sinus; ovary, elongated, conical, 8 mm. long, 5 mm. thick, canescent; style equal in length, quite thick, at first pubescent, becoming glabrous toward the apex; stigma large, brown, glabrous, with 5 lobulations; young fruit elongated, 2 cm. long, brown, subglabrous, ligneous, 5-sided.

Type specimen 9584, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

A splendid appearing tree in humid forests at 4250 feet. *Mrs. Clemens* also collected flowers of this same species in the lake Lanao region of central Mindanao. Called by the Visayans "Tage-lelumboy." I take pleasure in naming this splendid tree after *Mr. George Welborn* of Cebu.

Easily distinguished from the Luzon species by its larger flowers.

EURYA Thunb.

Eurya auriculata Elm. n. sp.

Tree, 3 to 5 m. high; wood whitish, tough, covered with brown or grayish brown quite smooth bark. Leaves oval, alternatingly scattered along the rather rigid branchlets, variable as to size, rigid, lucid dark green above, yellowish green beneath, the average blade 6 cm. long, 3.5 cm. wide across the middle, subsessile, apex abruptly terminating into a blunt or slightly emarginate point, the base usually auriculately rounded, glabrous, entire or finely and crenately serrate, usually purplish; midnerve prominent beneath, reddish brown; lateral veins obscure, reticulately anastomosing, equally visible from both sides.

Flowers in small clusters upon the twigs and in the leaf axils; pedicels a few mm. long, nearly as thick, occasionally provided with short bracts; calyx rigid, deeply concave, entire and becoming split, cupular, imbricate, 5 mm. long but the outer basal segments shorter, more or less united at the base, glabrous, reddish brown, with thin pale white margins; petals also 5, imbricate, falsely united toward the base, broadly obovate, 6 mm. long, glabrous, white; stamens about 12, arranged in one series, 4 mm. long; filaments 2.5 mm. long, subglabrous, fusiform, the basal one third falsely united, attached to the sinus; anther nearly 2 mm. long, ovate, bilobed at the base, dehiscing laterally; style very short.

Type specimen 9544, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

A stocky tree, rather common in our locality at 5000 feet. Also collected by *E. D. Merrill* on Mount Halcon.

Somewhat similar to *E. macartneyi Benth.* of Hongkong, but sufficiently distinct. Readily distinguished from all other Philippine species by the auriculate leaf bases and large flowers.

GUTTIFERÆ.

GARCINIA Linn.

Garcinia pinnatinervia Elm. n. sp.

Small slender tree like shrub, 4 m. high; branches divaricate, smooth, the younger ones greenish. Leaves opposite, thick, coriaceous, soon falling, leaving large irregular scars, flat, glabrous, minutely punctate beneath, oblong to subrotund, apex rounded and terminated by a short obtuse point, base acute, the normal blades 15 cm. long, about 7 cm. wide; petiole 1.5 cm. long, easily separating at the base and provided with a disk like adnate interaxillary appendage; lateral nerves faint but equally visible from both sides, oblique, parallel, at least 20 pairs, reticulations none, midnerve beneath very prominent. Fruits 8 to 12-celled, subsessile, subglobose, the ends more or less flattened, 3 cm. in diameter, chiefly along the branches, its fleshy rind yellowish green and shining,

its meat very acrid, the juice yellowish and sticky; seeds about 8, solitary in each cell, hard, woody, reddish brown when dry, flattened, 1.5 cm. long, one half as wide; flowers not seen.

Type specimen 7190, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

Rare in damp woodlands. Has also been collected on Basilan island.

CALOPHYLLUM Linn.

Calophyllum hibbardii Elm. n. sp.

Tree, 10 m. high; stem 5 dm. thick; wood red except the thin sap wood, odorless, easily cutting; bark brown to gray, reddish beneath the epidermis, bleeding with a yellowish gummy sap; main branches rigid, crooked; the ultimate ones comparatively short and forming dense bushes, green, easily breaking. Leaves opposite, flat, rigid, ascending, the younger ones yellowish green beneath, dull deep green above, oblong to elliptic, about 1 dm. long, 5 cm. wide across the middle, the entire margins provided with a brown callous subinvolute edge, both ends similarly obtuse; petiole glabrous, 1.25 cm. long, thick; midnerve very prominent beneath, dark brown in the dry state; lateral nerves obscure, very fine and numerous, equally visible from both sides; bud scale acuminate, 1 cm. long, cinnamon brown, covered with minute resin colored glands. Racemose inflorescence from the leaf axils or a few racemes clustered from the twigs, 4 to 7 cm. long, sparingly branched, ascending, light green, rigid, and quite fragile; pedicels 1 cm. long, subcompressed or angular, glabrous, early becoming detached, divaricate; calyx imbricately overarching the buds, in anthesis spreading, 4, unequal in size, mostly broadly obovate, glabrous, deciduous, 1 cm. long or less; petals none; stamens innumerable, densely bunched and forming the base of the ovary; filaments crinkled, glabrous, subequal, averaging 5 mm. in length; anthers light yellow, about 2 mm. long, 0.75 mm. wide, subcompressed, oblong to subcuneate in outline, apex roundly truncate and usually emarginate, dehiscing laterally; ovary greenish, glabrous, globose, 3 mm. thick; style rather thick. also 3 mm. long; stigma prominently disk shaped.

Type specimen 9837, *A. D. E. Elmer*, Dumaguete Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

Most similar to *C. prainianum King*, but petioles not 2.5 to 4 inches long; racemes more than 1.5 inches, not lax; flowers more than 0.25 inches in diameter; pedicels also longer than that length; outer sepals not puberulous.

Discovered on a wind swept forested ridge at 3500 feet. Flowers creamy white and sweetly fragrant. I take pleasure in naming this species in honor of *Dr. H. S. Hibbard*, Superintendent of the Silliman Institute at Dumaguete.

VIOLACEÆ.

VIOLA Tourn.

Viola toppingii Elm. n. sp.

Biennial herbs, in small tufts, forming large patches; stems erect or reclining, slender, shining, glabrous, several from the same root crown; stolons slender, chiefly subterranean. Leaves mostly cauline, arranged above the middle, only a few or none from the base in the adult plants, broadly cordate, with a rounded very wide sinus, 2.5 cm. wide, about 2 cm. from the base to the acute or obtuse apex, glabrous, margins entire or here and there with a minute whitish callous point, thin, nerves very obscure and faint, quite variable in sizes; petioles slender, glabrous, varying much in length, the longest basal ones 12 cm. long; stipules foliaceous, glabrous, 3 to 5 mm. in length, entire, triangularly linear. Pedicels usually a trifle shorter than the foliage, glabrous, very slender, arising from the upper leaf axils or from the axils of the branchlets, recurved at the apex; calyx green, glabrous, 5-segmented, each segment provided at the base with a blunt appendage, about 3 mm. long, broadly lanceolate and with acute tips; petals 4, the lower one with a shallow sac at the base and bidentate at the apex, the balance oblong and with rounded apices, 9 mm. long, hyaline, nerved, white, but the inner side near the base streaked with dark rich purple or indigo blue; stamens 5, opposite the calyx segments and inserted upon their bases; filaments

none or more properly consisting of a broad brown connective extending 1 mm. beyond the anthers which are at least 1.5 mm. long and 1 mm. wide; ovary glabrous; style 2 mm. long, thickened toward the apex; stigma terminal, obscurely triangular; capsule 3-celled, 7 mm. long, linear oblong, sharply pointed, strongly 3-ridged; seeds 1.5 mm. long, 1 mm. in diameter, smooth, subglobose, more pointed at the base.

Type specimen 8649, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

It is always found about springs and in seepage soil, forming turf with grasses and sedges. Quite variable. Named after *Mr. D. Leroy Topping* who first collected it in 1903. It is related and indeed closely so to *V. serpens Wall.*

ARALIACEÆ.

BOERLAGIODENDRON Harms.

Boerlagiodendron serratifolium Elm. n. sp.

A very sparingly branched shrub, 3 to 5 m. high; branches at the top only, short and rigid. Blades about as long as the petiole, from 3 to 7-lobed, the middle lobes larger, the segments usually cut to the middle, apex slenderly acuminate, the margins serrate to serrately toothed or minutely lobed and quite irregular; the midnerve of each part conspicuous beneath, the lateral ones rather widely scattering and ascendingly curved, tips terminating into the more prominent teeth; petiole 3 to 5 dm. long, glabrous, 8 mm. thick, grooved along the upper side, smooth, usually spotted with minute pale white lenticels, the base provided with a series of crinkled rings; stipule rigid, glabrous, broadly triangular, obtuse at apex, 1 cm. long, brownish along the thin margins. Inflorescence dimorphic, terminal, corymbose, rigid, 3 dm. across, erect, composed of small orange yellow clusters subtended by thick bracts; primary peduncle about 5 cm. long, purplish, compressed and grooved on the flattened sides, glabrous, subtended by a large bract, forked at the apex; each fork giving rise to two secondary fertile staminate peduncles and an axillary pistillate one; secondary peduncles 8 cm. long, glabrous, pur-

plish, subtended by 2 to 3 large bracts and bibracteate 2 cm. from the base, all the bracts similarly colored; staminate head ellipsoid, 1.5 cm. long, 1 cm. in diameter, yellow; flowers coming into anthesis from the base toward the apex, each subtended by a thick brown bract with rounded fimbriate margins; calyx 4 mm. long, 3 mm. wide across the top, turbinate, glabrous; corolla thick, glabrous, 5 mm. long, united, terminated into 5 to 7 obtuse teeth, easily detached from the blunt rim of the persistent calyx; stamens about six; filaments glabrous, fleshy, erect, 7 mm. long, the distal ends much thinner, inserted with the corolla upon the disk; anthers versatile, oblong, 2 mm. long, dorsifixed; fertile pistillate peduncle 2 cm. long, subtended by bracts; pedicels 5 to 8 mm. long, more or less flattened; fruit globose in outline, finely rugose, glabrous, dark purple, obscurely 4-angled; exocarp very thick and leathery; seeds 4, much flattened, straw color, nearly orbicular, 3 mm. across.

Type specimen 7194, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

EBENACEÆ.

DIOSPYROS Linn.

Diospyros reticulata Elm. n. sp.

A 7 m. high bushy tree, with slender glabrous branchlets; wood very hard, white, covered with checked dark brown bark. Leaves descending, very chartaceous, strongly conduplicate on the upper side, rich lucid green above, lighter green beneath, glabrous, very unequal in size, lanceolate, the medium sized blades 12 cm. long and 4 cm. wide, margins entire, but more or less ruffled, apex acuminate, base obtuse to subcuneate, alternatingly scattered along the twigs; petiole 1 cm. long, glabrous, separating while drying; midvein reddish brown, caniculate above, very prominent beneath; lateral nerves 9 to 15 on a side, much less prominent but equally plain on both sides, their ends reticulately anastomosing, scarcely more conspicuous than the very evident reticulations. Fruits short pedicellate, solitary or in pairs from the leaf axils, subglobose, at least 15 mm. thick when collected,

green, quite hard, shining, 4-celled, with 1 seed in each cell, apex short apiculate; seeds hard, smooth, black, 1 cm. long, the 2 inner sides flat or only slightly concave, the dorsal side convex, attached to a central placenta by the ventral edge toward the base; calyx persistent, the basal one third united, rigid, glabrous, spreading; the 3 to 4 lobes broadly rounded, the free portion subrecurved in fruit, occasionally unequal in size, about 6 mm. across.

Type specimen 9242, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

It was discovered in dense shrubberies of depressions of grassy hillocks near the Botocan falls on the trail towards Louisiana.

Its affinities are with *D. pilosanthera Blco.* and *D. biflora* of the same author. It is, however, nearest related to the latter, but is not a 10 meter high tree; our leaves are without glands and their petioles can hardly be described as very short, nor are the calyces (of at least the fruits) campanulate.

Diospyros brideliaefolia Elm. n. sp.

Tall tree, 18 m. high; stem 4.5 dm. thick; branches chiefly at the top, quite crooked; branchlets lax, the young twigs glabrous; wood moderately soft, easily cutting, white throughout but upon being exposed its color changes to a carrot yellow and has also that odor; bark smooth, but occasionally checked longitudinally, mottled. Leaves equally smooth on both sides, submembranous, light green above, glaucous green beneath or occasionally with a tinge of yellow, descending, nearly flat or curvingly conduplicate on the upper side, margins entire or finely crinkled especially toward the apex, broadly lanceolate to oblong, apex acute, base obtuse, much varying in size, the larger blades 12 cm. long, 5 cm. wide across the middle, alternate; petiole 1 to 2 cm. long, glabrous; nerves conspicuous beneath, sparsely strigose with short yellowish hairs, the 5 to 7 lateral pairs ascending, reticulately anastomosing. Flowers solitary or several from the leaf axils, along the leafy twigs; calyx subsessile, usually subtended by a small thick bracteole, upon a very short peduncle; segments 4, green, rigid, yellowish brown pubescent on both sides, united at the base, broadly obovate,

acute or rounded at the apex, 4 mm. long, nearly as broad, saucer shaped; corolla urceolate, 1 cm. long, 7 mm. thick, glabrous, subpendulous, pale white below the middle, pink toward the apex, deciduous; segments 4, strongly recurved, broadly rounded, finely ciliate on the margins, constricted at the base; stamens 16, included, strict, in 2 opposite series, all inserted upon the basal portion of the corolla; filaments whitish, 1 mm. long, flattened, glabrous; anthers dull brown, 4 mm. long, 1.5 mm. wide at the base, gradually tapering to a fine apex, the middle portion of each side strigose, dehiscing laterally; ovary flat, yellowish, slightly hairy, surrounded by 8 blunt and glabrous appendages; fruits not seen.

Type specimen 9722, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

A very remarkable species, only rarely represented in dense humid woods at 4250 feet. Apparently it belongs to the section *Danzleria*, and its leaves are suggestive of *Bridelia* species. Called by the Visayan woodsman, "Gisok-bayi."

SYMPLOCACEÆ.

SYMPLOCOS Linn.

Symplocos fragrans Elm. n. sp.

Strict tree, 5 to 7 m. high; wood soft, whitish, odorless; bark smooth, mottled, green beneath the epidermis; branches very numerous, lax, brown. Leaves equally dull green on both sides, turning lighter green while curing, chartaceous, tips recurved, broadly lanceolate or narrowly elliptic, margins entire and with a minutely involute callous edge, alternate, about 1 cm. apart, base obtuse, apex more or less abruptly acuminate, variable in size, the average blade 6 cm. long by 2.5 cm. wide across the middle, glabrous; petiole 5 to 10 mm. long, subglabrous, grooved along the upper side; midnerve yellowish green in the dry state and prominent beneath, the 3 to 5 lateral pairs slightly more prominent than the coarse reticulation. Inflorescence a simple raceme, 2 to 3 cm. long, solitary or 2 to 3 from the same

leaf axil or axils of the fallen leaves along the twigs, green, subglabrous; pedicels about 5 mm. long, sparingly strigose, ascending or divaricate, scattered, subtended by a minute bract, strict; calyx greenish, strigose, subtended by 1 to 3 very minute bracts, campanulate, 2 mm. long, nearly as wide across the top; the 5 broadly rounded segments strigose on the outer side, finally spreading rotately, persistent; petals 5, white, 3 mm. long, the larger ones nearly 2 mm. wide, oblong, broadly rounded at the apex, inserted upon the rim of the calyx throat, glabrous; stamens 20, inserted upon the base of the corolla and falling with it; filaments glabrous, free, subequal, 2.5 mm. long; anther 0.5 mm. long and equally as wide, basifixed, base bilobed, dehiscing laterally; style pubescent, 3 mm. long, terminated by a subentire capitate stigma; ovary inferior; fruit not seen.

Type specimen 9873, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

This handsome tree was discovered in humid woods at 4500 feet. The flowers are sweetly fragrant.

It would be referred to *S. betula Brand*, but for the petioles, sparsely flowered spicate racemes, and strigose calyx.

Symplocos curtiflora Elm. n. sp.

Slender tree, 7 m. high; wood odorless and tasteless, sappy white throughout, easily cutting; bark smoothish, mottled, green beneath the epidermis, its inner layer white; branches lax and numerous, smooth, brown. Leaves glabrous, submembranous, similarly pale green on both sides, flat or only slightly conduplicate on the upper side, alternatingly scattered 1 cm. apart, glabrous, the subentire margins with a minutely involute callous edge, narrowly elliptic or broadly lanceolate, apex more or less abruptly acuminate, base acute to cuneate, the average ones 7 cm. long by 2.5 cm. wide across the middle; petiole glabrous, 5 to 8 mm. long; midvein yellowish green in the dry state, prominent beneath, the 4 to 6 pairs of lateral nerves obscure and coarsely anastomosing. Flowers not seen; infrutescence simple, 1 cm. long, axillary, glabrous, dark green; fruits lighter green, glabrous, subsessile, ovoidly elliptic, 6 mm. long, 4 cm. thick below

the middle, at the base subtended by a few minute bracts, bearing at the apex vestiges of the 5 calyx segments, 2-celled.

Type specimen 9802, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

On a lightly wooded ridge at 3750 feet. Known to the Visayans as "Pun-pun".

Differs from the preceding by its much shorter infrutescence and subsessile fruits. These characters in addition to the petioles prevent it from being placed with *S. betula Brand.*

Symplocos angularis Elm. n. sp.

Shrubby tree, about 6 m. high and with a 1.5 dm. thick stem; bark smooth, brown; branches numerous, ascending; wood not hard, yellowish. Leaves ascending, coriaceous or submembranous, glabrous, when dry turning to the characteristic yellowish green color, flat, alternatingly scattered along the dark green and glabrous twigs, oblanceolately oblong, the larger blades 1 dm. long by 4 cm. wide above the middle, apex obtuse to acute, base attenuate, quite variable in size, entire or finely serrate especially above the middle; petiole 0.5 to 1 cm. long, stout, glabrous, flattened on the upper side; midnerve very prominent beneath and grooved on the upper side, the 7 to 9 lateral pairs comparatively inconspicuous, the reticulations numerous and quite evident. Inflorescence spicate, chiefly from the lowermost leaf axils; the spikes solitary or on floriferous branchlets, 2 or even 3 from the same place, varying from 1 to 5 cm. in length, glabrous or thinly cinereous when young; flowers evenly scattered along the rachis, upon short very thick pedicels, usually subtended by bracts; involucral bracts dry, acute, brown, unequal, subpersistent, short cinereous pubescent on the dorsal side; calyx thick, similarly pubescent, turbinate, 3 mm. long, nearly as broad as the throat, its 5 obtuse segments only one third the length; corolla dull or creamy white, 3 to 5 mm. long, 2 mm. wide, oblongish, obtuse at apex, falsely united at the base, occasionally unequal in size, delicate and soon wilting; stamens of the same color, indefinite,

unequal in length, the longer ones 3 mm. long, freely inserted upon the base of the corolla; filaments glabrous, inflexed; anthers 0.5 mm. in diameter, suborbicular; fruits 1 cm. long or a trifle longer, oblong, glabrous and greenish, 5 mm. thick, equally subtruncate at both ends, the apex bearing the 5 persistent calyx segments, angularly wrinkled in the dry state.

Type specimens 8736 in fruit and 8554 in flower, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

Collected in shrubberies of the limestone sinks of the pine region at 4750 feet.

Primarily differs from *S. ferruginea Roxb.* and the Philippine variety by its glabrous inflorescence and angular greenish fruits.

OLEACEÆ.

JASMINUM (Tourn.) Linn.

Jasminum ixoroides Elm. n. sp.

Sparingly branched shrubs, the wiry branches sprawling over limestone cliffs. Leaves conduplicate, paler green beneath, opposite, very unequal in size, ovate to lanceolate, glabrous, entire, apex acute, base rounded, 5 to 7 primary nerves on each side; stipule obsolete or a rimlike vestige of hairs; petiole glabrous, 1 cm. long, articulate at a little below the middle, the basal portion strongly curved. Inflorescence terminal, erect or ascending, subtended by foliaceous bracts, corymbose, numerously rebranched, yellowish pubescent or subglabrous; ultimate peduncles bearing 3 flowers; pedicels short, articulate or at least easily detached at the base and subtended by minute bracts; calyx united into a tube 4 mm. long, terminated by 5 to 7 filiform 6 mm. long segments; corolla tube 15 mm. long, glabrous; its segments about 9, oblong, 8 mm. long, rotate, the base imbricate, snow white; the slender glabrous style nearly equalling the throat; stigma clavate; stamens 2; filaments 0.5 mm. long, attached to the corolla tube below the middle; anther nearly 4 mm. long, pointed, 1 mm. wide, straplike, laterally attached to the thick

connective, base truncate; mature fruits ellipsoid, nearly 1 cm. long.

Type specimen 8731, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

Differs from the common valley pubescent species *J. populifolium Blm.* (*J. luzoniense Vid.*). The Igorrotes call it "Chacsil" and its slender stems are used for tieing purposes.

APOCYNACEÆ.

ANODENDRON A. DC.

Anodendron corymbosum Elm. n. sp.

Scandent shrub, ultimately sprawling, with milky sap; stems inclined to twine, smooth, green, when old brown, terete, the younger twigs somewhat flattened. Leaves opposite, subcoriaceous, lighter green beneath, extremely unequal in size, the smaller ones lanceolate and usually toward the ends of the branchlets, the few larger ones ovate, the average ones 15 cm. long by 7.5 cm. wide excluding the glabrous 3 cm. long deciduous peduncles, apex sharply acuminate, base rounded or subemarginate, glabrous, 9 to 13 prominent dark brown pairs of nerves. Inflorescence terminal or subterminal, corymbose, glabrous and subglaucous, 1 dm. across, main peduncle 3 to 5 cm. long; the lower secondary ones about as long, subtended by small brown bracts, corymbosely branched above the middle; pedicels 1 to 2 mm. long, puberulous, usually 2 to 3-clustered upon the same ultimate stalk, several bracteate at the base; calyx glabrous, 2 mm. high, widely spreading, the 5 imbricate segments broadly oblong and obtuse; corolla twisted, dark purple, the 5 segments united at the base into a short tube, the lobes oblong and rounded at the apex, twisted to the right, 2 to 3 mm. long; stamens included, inserted upon the corolla tube, the inner ones connivent over the stigma; fruits not seen.

Type specimen 8468, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

Forming tangled sprawling masses over copses of hot dry rocky places along the Bued river near camp Colgan.

Without mature fruits the proper genus cannot positively be determined.

VERBENACEÆ.

CALLICARPA Linn.

Callicarpa subglandulosa Elm. n. sp.

Erect tree, 6 or more m. high; stems 3 dm. thick; branches widely spreading above the middle; twigs angular, the younger portions yellowish lepidote. Leaves coriaceous, dark green and glabrous above except the nerves, densely covered beneath with minute yellowish glands, opposite, scattered chiefly toward the ends of the twigs, quite variable in size, ovately lanceolate, apex sharply acuminate, base short obtuse or rounded, the average blades 15 cm. long by 7 cm. wide below the middle, entire; petiole lepidote, about 3 cm. long; nerves very prominent beneath, 5 to 7 or even 9 lateral pairs, ascendingly curved, the lower two pairs approximate and arising from near the base, tips anastomosing, the numerous cross bars parallel and prominent, reticulations faint, all more or less lepidote or covered with minute clusters of stellate hairs. Inflorescence terminal or from the uppermost leaf axils, ascending, 1 to 2 dm. long, corymbosely branched above the middle, densely covered with minute stellate clusters; branches subtended by elongated recurved subpersistent bracts whose ventral sides are glabrous; pedicels 2 mm. long, woolly, subtended by linear bracteoles; calyx turbinate, 3 mm. long, equally as wide across the top, lepidote and glandular, 4-apiculate; corolla white, 6 mm. long, also turbinate, glabrous, glandular only on the outer side of the broadly rounded 4 segments, nervose; stamens 4; filaments filiform, glabrous, 8 mm. long, inserted upon the corolla 1 mm. from the base; anther subdorsifixed, oblong, with truncate ends, 1.25 mm. long; style linear, comparatively thick, terminated by a slightly enlarged stigma, glabrous; ovary subglobose, the upper one half densely covered with resinous glands; fruits subglabrous, 5 mm. thick, globose or obscurely obovoid, 4-seeded; seeds encased in crustaceous exocarps with broad convex dorsal side and with 2 inner subconvex sides.

Type specimens 9739 and 10362, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April and June respectively, 1908.

Only here and there observed in humid woods and in the moss covered jungles from 3500 to 6000 feet. Called "Guisokmagamai" in the native dialect.

Very distinct and only distantly related to my *C. palensis* from eastern Leyte.

CLERODENDRON Linn.

Clerodendron klemmei Elm. n. sp.

A small slender tree; old bark brownish, young bark smooth and yellowish, covered with elongated lenticels. Leaves numerous, opposite, from lanceolate to oblong in shape or even obovate, variable, the medium sized blades 12 cm. long, 4 cm. wide, apex mostly acuminate, base attenuate or simply acute, submembranous, glabrous, flat; petiole 1 to 3 cm. long, glabrous, rather slender and deciduous; lateral nerves 5 to 7 on each side, prominent beneath, ascendingly curved, the coarse reticulations also prominent. Inflorescence terminal, or subterminal, subcorymbose; peduncles smooth, glabrous, yellowish, more or less flattened at the distal end, ascending, 4 to 7 cm. long; secondary peduncles less than one half that length, rather numerous and fastigiate, subtended by 5 mm. long filiform bracts; pedicels 5 to 8 mm. long, puberulous, usually bibracteate at the middle; calyx glabrous, 4 mm. long, campanulate, its 5 segments acute and 1.5 mm. in length; corolla tubular, 6 cm. long, glabrous, gradually thickened toward the apex, deciduous; its 5 lobes regular, 5 to 7 mm. long, oblong, obtuse, spreading, 3 mm. wide; stamens 4, exceeding the corolla by 1 cm., glabrous, inserted upon the corolla some distance beneath the throat; anthers versatile, oblong, 2.5 mm. long; style slender, glabrous, equalling the stamens; ovary glabrous, dome shaped; stigma subclavate, with a pronounced point; fruits shining smooth, olive green, obovoid, 13 mm. long by 1 cm. in diameter above the middle, that portion of the calyx containing the fruit much expanded and with a thin apiculate rim.

Type specimen 8679, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

Named after *Mr. W. Klemme* of the Forestry Bureau, who first discovered it in the province of Lepanto.

Its much smaller leaves, much larger and more numerously branched paniculate cymes, and the double length of its corolla tube serve to segregate it from *C. similis Merr.*

Clerodendron preslii Elm. n. sp.

Strict tree, 7 m. high; wood soft, white, odorless and tasteless; bark smoothish, brown; branches lax, slender, divaricate, mostly above the middle; the twigs angular and densely covered with a short dark rusty brown pubescence. Leaves opposite, flat, horizontally spreading, submembranous, dull green and glabrous above except the nerves, yellowish green beneath caused by the very numerous fine glands, exceedingly variable in size, the average blade 15 cm. long by 5 cm. wide below the middle, entire or merely apiculate to even dentate, ovate, slenderly tapering into the long acuminate point, base broadly obtuse or subtruncate, ovate; petioles slender, varying from 1 to 10 cm. long, similarly pubescent as the twigs; nerves 5 to 7 lateral pairs, prominent beneath, short brown pubescent, the basal pair arising from near the base, ascending, tips obscurely united, the cross bars parallel and quite prominent. Inflorescence terminal, sparsely paniculate, the basal pair of branches subtended by small leaves, less than 1 dm. long, sparsely flowered; secondary peduncles strict, terete, pubescent, ascending, 1 to 3 cm. long; pedicels 3 mm. long, similarly covered with dense woolly hairs; calyx tubular, somewhat flattened, dark purple, ascending, 2.5 cm. long, 6 mm. thick above the middle, rufous pubescent toward the base, terminated by 5 acuminate teeth; 6 mm. long corolla deciduous, white throughout, 3 to 5 cm. long, glabrous, the basal 2 to 3 cm. slenderly tubular, terminated by 5 lobes; the lobes 1.5 cm. long, oblong to obovate; stamens 4; filaments whitish, glabrous, inserted upon the throat of the corolla, as long as the segments, the upper portion recurved; anthers dark brown or nearly black, dorsifixed, versatile, 2.5 mm. long, oblong, bifid at the base; style very slender, glabrous, nearly 5 cm. long; stigma 2-lobed; ovary

glabrous, truncate at apex; fruits olive green, subglobose or flattened and obscurely obovoid, 2-seeded, the covering yellowish.

Type specimen 10223, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May. 1908.

Discovered only once in moss laden woods at 4750 feet on the trail from the springs to the summit of the lesser peak. Named in honor of *Dr. K. B. Presl*, who aside of other writings has done a great work on Philippine botany.

LABIATÆ.

SCUTELLARIA Linn.

Scutellaria marivelensis Elm. n. sp.

Perennial, subfrutescent; stems slender, pulverulent, terete, 2 mm. thick, several from a rigid woody root crown, mostly branched some distance from the base; branches very slender, short dirty yellowish pubescent, quite freely rebranched. Leaves delicate, quite variable in size, less than 1 cm. long and 8 mm. wide, ovate, the smaller ones subrotund, the larger ones bluntly lanceolate, entire or minutely denticulate on each side toward the round apex, base broadly rounded, opposite, scattered all along the branchlets, dark green and minutely sprinkled with minute hairs on the upper side, much paler, similarly hairy and minutely punctate beneath; petiole very slender, 3 mm. long, finely pubescent; nerves 1 to 3 pairs, ascending, submarginally united, clearly visible beneath, coarse reticulations obsolete. Inflorescence terminating slender branchlets, usually 3 to 5 cm. long, spicate, cinereous; flowers blue except the whitish basal portion, odorless, opposite or in subwhorls, 0.5 to 1 cm. apart; pedicel at most 5 mm. in length, persistent, subtended by bracts; calyx cinereous, 2 mm. long, greenish, nearly 3 mm. broad across the throat; its segments broadly rounded or the lower lip subtruncate and the upper one becoming much elongated in fruit and strongly reticulate; corolla delicate, 1.5 cm. long, tubular, gradually enlarged from the oblique subinflated base, puberulent on the exterior; filaments hyaline, included, adnate to the corolla tube at about the middle, glabrous;

anthers 0.5 mm. across, basifixed, very broad at the base, obscurely ciliate; ovary glabrous; fruiting calyx dry and straw colored; nutlets several, brown, glandular or hispidulous, irregularly angled, 0.75 mm. in diameter.

Type specimen 6984, *A. D. E. Elmer*, Mount Mariveles, Province of Bataan, Luzon, November, 1904.

This species is verv distinct in habit and very local in distribution. It is plentiful in the woods of mount Mariveles from 1500 to 3000 feet and has been collected by nearly every collector who has visited that mountain. Only once collected outside the type locality so far as I know. *Maximo Ramos* collected it in Rizal province. In all our distributions it was sent out as *S. luzonica Rolfe* which was based upon a specimen which *Mr. Lobb* undoubtedly obtained from the province of Benguet. My specimens 5835 and 7650 from Baguio are what is here considered *S. luzonica Rolfe*, and which extends through the mountainous regions of northern Luzon to Formosa. Possibly *Mr. Rofle* tried to fit his description to two distinctly different plant species. The stems and branches of the mount Mariveles plant spread over rocky soil or trail upon cliffs; the root crown is always hard and woody, the stems are subfrutescent. The plant from the northern provinces is herbaceous throughout and inhabits moist compact soil chiefly along streams. No critical eye would take them for the same species in the field, and in the herbarium the Mariveles specimens can without special examination be singled out at once from all the other Philippine species.

ACANTHACEÆ.

HYPOESTES Soland.

Hypoestes linearis Elm. n. sp.

A tufted biennial or perennial herb, 3 to 5 or even 8 dm. high; stem slender, mostly glabrous, several from the same root, angular or striate, green, terminated by lax, sparingly flowered panicles. Leaves opposite, linear to lanceolate, quite variable in size, the normal blades 5 cm. in length, 6 mm. in width, membranous, entire, darker green and glabrous

beneath, base acute or in the wider leaves obtuse, gradually tapering toward the bluntly pointed apex; petiole 3 to 5 mm. long, glabrous, slender; nerves faint, about 4 to 5 primary lateral ones on each side, much ascendingly curved. Panicle 1 to 2 dm. long; main and secondary branches 1 to 3-branched, the latter arising from above the middle, slender, strict, more or less glandular pubescent, divaricate, subtended by minute setaceous bracts or the main branches by foliaceous bracts; subsessile flowers 1 to 3-clustered, pink, delicate; involucral bracts indefinite, very unequal in length, the outer ones green and about 8 mm. long, the inner ones setaceous, all finely ciliate; calyx united at the base, its 5 setaceous segments 2 to 3 mm. in length, very similar to the inner involucral bracts; corolla 12 mm. long, the basal one half slenderly tubular, 2-lipped, sparsely strigose on the exterior; the lobes oblong to subrotund, 6 mm. long; style exceeding the corolla, subpersistent, exceedingly slender, glabrous, bearing a minute terminal stigma; stamens 2, included; filaments also slender and glabrous, inserted upon the throat of the corolla; anthers dorsifixed, oblong, 2 mm. long, 0.75 mm. thick; capsule 1 cm. long, strigose, dehiscing from the apex clear to the base, oblanceoloid; each part with seeds which are set in the sinus of the very stout and prominently antrorsely curved hooks; seeds 1.5 mm. in diameter, flattened, brown, papillose.

Type specimen 7830, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, March, 1907.

Easily confused with the common *H. cumingiana Benth.* which has broader leaves and flowers twice as large.

RUBIACEÆ.

TRICALYSIA A. Rich.

Tricalysia negrosensis Elm. n. sp.

A laxly branched 2 to 3 m. high shrub; wood rather soft, covered with yellowish gray bark which when old becomes thinly checked longitudinally; twigs puberulous or short pubescent. Leaves submembranous, flat, paler green beneath on the nerves only, oblong to broadly lanceolate, scat-

tered, quite unequal in size, apex acute to acuminate, base acute to obtuse, the larger blades 15 cm. long by 4 cm. wide across the middle; stipule rigid, short pubescent, extending between the petioles, rounded, terminating into a prominent point or cusp; nerves prominent beneath, the 6 to 9 pairs of lateral nerves ascending, the tips only obscurely united, short yellowish gray tomentulose, the nerve axils usually provided with hair tuftlets, the fine reticulations quite evident beneath; petiole tomentulose, 3 to 5 mm. long. Inflorescence axillary, short cymosely clustered, the several flowers upon very short rigid bracteate and pubescent stalks; the short pedicels gradually tapering into the calyx, usually bibracteate at the base, also pubescent; calyx turbinate, yellowish tomentulose, nearly 3 mm. long, 2.5 mm. wide across the top, 4 to 5-apiculate; corolla imbricate and twisted in the bud state, the tube 3 mm. long, glabrous on the exterior, woolly on the interior especially about the throat; the 4 to 5 segments 3 mm. long, oblong, thick, obtuse, strongly reflexed in anthesis; stamens 4 to 5, alternating with the segments and inserted upon the corolla a trifle below the throat, subsessile; anthers nearly 2 mm. long, triangularly oblong, basifixed, usually lobed at the base, strict; style strict, terete, glabrous, about 4 mm. long, somewhat thinner toward the base; stigma comparatively thick, 1 mm. long, ultimately becoming divided into 2 flattened arms; ovary inferior, bearing a prominent disk, 2-celled, with 2 pendulous ovules in each cell.

Type specimen 9685, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

This species was found on a steep densely wooded slope of a deep ravine at 3500 feet.

In external characters it appears very similar to *Randia mindorensis Elm*, but the two pendulous ovules in each of the two cells place it very properly under *Tricalysia*. Differs from *T. tinagoensis Elm.* in its smaller underneath pubescent leaves and in floral characters.

LASIANTHUS Blm.

Lasianthus humilis Elm. n. sp.

Low, lax, 1 m. high; undershrub; stem less than 1 cm. thick,

smooth, greenish, breaking with a snap; branches mostly toward the top, at right angles to the stem, only sparingly rebranched, entirely glabrous. Leaves flat, subcoriaceous, glabrous and dark lucid green above, much paler and pubescent beneath, horizontally spreading but occasionally subdeflexed, opposite, in distichous rows, about 5 cm. apart, oblongish elliptic, gradually tapering to the acute apex, base suboblique, margins entire and subinvolute at least in the dry state, obliquely rounded or at the very base minutely auriculate; nerves very prominent beneath, pinnate, ascending, united submarginally, the cross bars quite conspicuous, 5 to 7 lateral pairs; petiole thick, pubescent, 5 mm. long; stipule 8 mm. long, acuminate, pubescent. Infrutescence sessile in the leaf axils; involucral bracts very unequal, the larger ones 2 cm. long, slenderly acuminate, olivaceous pubescent, striate, entire; fruits globose or subellipsoid, nearly 5 mm. in diameter, short pedicelled, the apex crowned by the short calyx tube which in most cases still bears the 5 ciliate teeth; corolla white, rather broad and short, united below the middle, the 5 segments ultimately strongly reflexed, deciduous; drupe with a juicy azure blue skin, foetid, 5-seeded; the stones 4 mm. long, frequently unequal in thickness, the ventral 2 sides plane, the dorsal convex, straw brown.

Type specimen 9687, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

This low undershrub was discovered in woods near a wind swept ridge at 3500 feet.

Not *L. copelandi Elm.* which has thinner and more numerous leaves with pubescent upper surfaces and twigs densely pubescent.

PSYCHOTRIA Linn.

Psychotria negrosensis Elm. n. sp.

Slender shrub, 2 to 3 m. high; its wood whitish, soft, covered with smooth mottled bark; twigs suberect, slender, sparse, grayish brown, the younger parts green and glabrous. Leaves smooth and glabrous on both sides, much darker green above, coriaceous, flat, opposite, mostly toward the ends of the twigs, oblong to subelliptic, apex abruptly acute,

base gradually tapering to the obtuse or subrounded, margins entire, 10 cm. long by 4 cm. wide across the middle, but frequently much smaller; petiole 1 to 2 cm. long, stout, glabrous; nerves very prominent beneath, glabrous, ashy gray at least in the dry state, greenish white when fresh, the 7 to 9 lateral pairs pinnate and obscurely united at their ends; stipule caducous, the basal middle portion thick, glabrous, between the petioles, 2 cm. long, the entire margins and apical portion brown, apex blunt. Inflorescence terminal, 3 to 5 cm. long, paniculate; primary peduncles occasionally 3, glabrous, subtended by minute bracts, greenish white, subcompressed; secondary peduncles stout, divaricate; pedicel subsessile or 3 to 5 mm. long, glabrous; calyx 3.5 mm. long, 3 mm. wide across the top, somewhat flattened, glabrous, turbinate, truncate; corolla 7 mm. long, glabrous on the exterior, densely woolly on the interior about the throat, the basal portion tubular, the upper portion divided into 5 obtuse segments; stamens 5, alternating with the segments and inserted upon the throat; filaments 0.75 mm. long, glabrous and delicate; anther ellipsoid, 1.5 mm. long, 1 mm. thick, the connective comparatively thick, black and rugose, attached and dehiscing ventrally; style slender, glabrous, 5 mm. long, bearing a clavate 1 mm. long subentire or obscurely lobed stigma; ovary inferior, 2-celled, 2-ovulate, topped with a thick disk; fruit not known.

Type specimen 9686, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

This undershrub was discovered on a very steep rather wooded slope at 3500 feet.

It has the calyx of *P. malayana Jack.* From *P. luzoniensis* (*C. et S.*) *F. Vil.*, (*P. tacpo Rolfe*) it differs most prominently by the very large stipules.

Psychotria cuernosensis Elm. n. sp.

Scandent and forming tangled bushes; old stems brown, tough, 2 cm. thick; branchlets green, freely rebranched, lax and slender, glabrous. Leaves also glabrous, opposite, scattered along the twigs, subcoriaceous, nearly flat, descending and with recurved tips, dark green on the upper side, much paler beneath, while drying turning to a reddish brown, the larger

blades 5 cm. long by 2 cm. wide across the middle, but most of them smaller especially toward the apex, the smaller ones lanceolate, the larger ones elliptic or very broadly lanceolate, entire, apex acute to acuminate, base obtuse or rounded; nerves 4 to 6 pairs, quite conspicuous beneath, glabrous, ascendingly curved; petiole glabrous, 3 to 5 mm. long; stipule 3 to 5 mm. long, dry, thin, brown, deciduous, intrapetiolar. Inflorescence terminal, glabrous, paniculate, 3 cm. long; primary peduncles usually 3, but in the smaller ones solitary, divaricately branched above the middle; pedicels subtended by apiculate bracts; calyx glabrous, the basal 3 mm stipitate, the upper 2 mm. cup shaped and obscurely 5-apiculate; corolla white, at least 4 mm. long, tubular, finally parted into 5 acute or obtuse segments, glabrous except the dense white woolly fringe about the throat; stamens 5, alternating with the segments and inserted upon the throat; filaments glabrous, equalling the anthers; anthers 0.75 mm. long, ellipsoid, attached to the rather prominent connective; style slender, glabrous, 2.5 mm. long, the clavate stigma becoming cleft; ovary with a prominent disk, inferior, 2-ovulate; drupe glabrous, 7 mm. long, 4 mm. thick across the middle, bearing at the apex a 2 mm. long calyx tube, the base pointed; the stony seed plane on the ventral side, obscurely ridged on the opposite convex side, attached to the thin basal portion.

Type specimen 10076, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

This scandent undershrub is quite common in moss laden woods at 4500 feet. It usually twines about small tree trunks and forms tangled bushes a few meters from the ground. Fruits "snow-berry" white.

Not *P. sarmentosa Blm.*, and is separated from *P. elliptifolius Elm.* by its congested inflorescence, larger flowers, leaves larger and more membranous with a different shape; and especially by the much shorter stipules.

Psychotria microphylla Elm. n. sp.

A branched climber; twigs quite rigid, glabrous, tough, brown. Leaves usually clustered toward the ends of the twigs, occasionally more scattering, coriaceous, shining dark green

above, olive green beneath or yellowish in the well dried leaves, erect or ascending, glabrous, tips strongly recurved, 2 to 4 cm. long, 0.75 to 1.5 cm. wide across the middle, opposite, broadly lanceolate to oblanceolate or subelliptic, apex more or less abruptly acuminate to caudate, the base subcuneate or acute or even obtuse, the entire margins or even the sides rolled under in the dry state; petiole glabrous, 3 to 5 mm. long; the midnerve very conspicuous beneath, the 3 to 5 lateral pairs ascending and rather obscure; stipule thin, dry, brown, deciduous, glabrous, intrapetiolar. Paniculate inflorescence terminal, 5 cm. long, glabrous; peduncles mostly 3, freely branched from the middle; branchlets and pedicels divaricate, subtended by apiculate or laciniate bracts; pedicels 2 to 4 mm. long, glabrous, articulate, bearing solitary or occasionally 2 to 3 sessile flowers; calyx 2.5 mm. long, glabrous, the lower one half stipitate, apex 5-apiculate; corolla greenish yellow, 2 mm. long, cleft into 5 obscure segments, the interior glabrous as well as the exterior; stamens 5, inserted upon the middle of the corolla tube, alternating with the segments; filaments about as long as the anthers, glabrous; anthers nearly 0.5 mm. long, ellipsoid, basifixed, the connective rather large, introrse; style glabrous, strict, 1.5 mm. long, bearing a comparatively large subentire stigma; ovary obovoid, chiefly inferior; drupe 6 mm. long, 3 mm. thick across the middle, glabrous, bearing 5-apiculate calyx teeth, 2-seeded; stones with a nearly plane ventral side, the convex side shallowly ridged, about 5 mm. long, attached to the base.

Type specimen 9505 in flower and 10191 in fruit, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March and May respectively, 1908.

This abounds at 4500 feet in the moss covered upper limit of the woods or in the *Freycinetia* shrubby jungles of a trifle higher altitude.

OPHIORRHIZA Linn.

Ophiorrhiza caespitulosa Elm. n. sp.

Loosely tufted annual; stems at most 1 dm. high, usually branched, densely covered with cinnamon brown crisp hairs;

branches similar in pubesence. Leaves opposite, ovate to ovately lanceolate or oblongish, membranous, flat, ascending or horizontally spreading, apex acute or obtuse, base obliquely rounded or obtuse, the larger blades 3 cm. long, 1.5 cm. wide across the middle, green on the upper surface, whitish on the lower, cinnamon brown pubescent on both sides, margins entire, very unequal in size; petiole 5 to 10 mm. long, densely brown pubescent; stipule setaceously acuminate, densely hairy; nerves conspicuous beneath, with 5 to 7 or even 9 lateral pairs, more densely hairy than the lamina, pinnately ascending. Inflorescence terminal, erect, the few and short branched cyme upon a solitary 1 to 2 cm. long densely reddish brown pubescent peduncle which is usually subtended by a subwhorl of leaves; secondary peduncles ascending, short, few branched, similarly pubescent, bearing from 5 to 9 flowers; pedicels pubescent, 3 to 5 mm. long or as long as the secondary peduncles, usually provided with green sparsely ciliate 3 mm. long bracts; calyx densely ciliate brown pubescent, united, only the 5 sharply pointed and green apices free, ovoid, 2 mm. long, almost as thick across the base; corolla white, 5 mm. long, tubular, the upper one-half ultimately becoming split into 5 straplike segments, bristly hairy on the exterior, glabrous within; stamens 5, separately inserted about the apical glabrous ovary disk; filaments 1.5 mm. long, glabrous, strict; anthers basifixed, 1 mm. long, linear, confluent about the stigma; style also glabrous, bearing a clavate stigma, slightly exceeding the stamens; ovary inferior, 2-celled, several ovules in each cell; fruit not known.

Type specimen 10332, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

This species forms tufts or patches in damp humus covered soil of dense woods at 4250 feet.

The leaves are much smaller than in *O. pubescens Elm.* and the whole plant has a distinctly colored pubescence. There are also some minor differences in the flowers.

HEDYOTIS Linn.

Hedyotis leucocarpa Elm. n. sp.

A 3 m. high erect shrub; wood soft, odorless, covered

with grayish bark; twigs angular, always glabrous. Leaves rigid, darker green above, glabrous, broadly lanceolate or oblongish, gradually tapering into the acuminate point, base obtuse to acute and usually subequilateral, entire margins, very unequal, the larger blades 15 cm. long and 4 cm. wide below the middle, but frequently much smaller, opposite, scattered along the twigs, rather thick but easily drying; nerves glabrous, subparallel, much ascending, quite fine and obscure, 5 to 7 lateral pairs, more numerous toward the base; petiole 3 to 8 mm. long, glabrous; stipule connate, also glabrous, 1 cm. long, the upper one half divided into laciniate segments, the basal lateral portions coarsely fimbricate, glabrous. Infrutescence axillary, mostly clustered, 1 to 2 cm. in diameter, several fruited, sessile or short stalked; involucre about 5 mm. long or much shorter, the bracts very unequal, ciliate pubescent, strongly nerved; pedicels quite short; calyx united at the base, 2 mm. long, oblongish elliptic, strongly nerved glabrous; corolla and stamens and pistils not seen; ovary inferior, glabrous and usually 4-lobulate; drupes subglobose or ellipsoid, 2 mm. in diameter, glabrous, short and slenderly pedicelled, at the apex bearing a crown of 4 obtuse strongly reticulate segments, white, 2-celled, splitting into equal plano-concave crustaceous halves; seeds about 8 in each cell, imbedded in a pulpy mass, coal black, hard, less than 1 mm. thick, strongly and irregularly angled, striate and minutely pitted.

Type specimen 9434, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros, Oriental Negros, March, 1908.

This shrub was discovered on a wind swept ridge at 3500 feet or at the lower limit of the fog region.

Evidently it falls with the *H. congesta R. Br.* group, but our specimens have thinner leaves and fruits at least larger.

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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

Vol. II. Manila, P. I., December 16, 1908. Art. 25.

THE GENUS ITEA

BY

A. D. E. ELMER.

—o—

ITEA Linn.

Shrubs or small trees or a few species herbaceous. Leaves alternate, exstipulate. Flowers in simple racemes, axillary or sometimes terminal. Calyx 5-segmented, short; petals perigynous, 5, valvate in the bud; stamens 5; ovary free, 2-celled; ovules from near the base, usually in 2 series; style ultimately splitting into 2 arms; stigma capitate; capsule septicidally dehiscing, the carpels bursting longitudinally along the ventral side; linear seeds acute at both ends.

A small genus of about one half a dozen species in tropical and subtropical east Asia. One along the Atlantic coast of the United States. Two in the Philippines,

Key of the Philippine species of *Itea*.

Leaves less than 8 cm. long.

1. *I. maesaefolia.*

Leaves larger.

2. *I. luzonensis.*

1. **I. maesaefolia Elm.** n. sp.

Shrubby trees, 5 m. high. Branches gray, rather numerously rebranched; bark thinly checked; young twigs glabrous. Leaves alternate, semirigid, ovate to oblong or subelliptic, the blade less than 1 dm. long, 3 to 5 cm. wide, darker lucid green above, glabrous, apex acute to acuminate, base obtuse; the 5 to 7 pairs of nerves ascending, arched, brown and quite prominent beneath, cross bars very faint; margins subentire below the middle, apiculate or serrate toward the apex; petiole 1 to 2 cm. long, glabrous, thickened toward the base. Inflorescence scattered along the twigs, in the leaf axils or in the axils of the leaf scars, usually clustered in 1 to 3 spicate racemes, glabrous; rachis spreading, 3 to 7 cm. long; flowers pale white, upon glabrous 2 cm. long pedicels which are usually arranged in small clusters; calyx gradually tapering into the pedicel, 1.5 mm. long including the 5 sharply acuminate teeth, glabrous; petals nearly free, 5, grown to the base of the calyx, alternating with the calyx teeth, prior to anthesis erect but ultimately strongly deflexed, slenderly acuminate, 2.5 mm. long, about 0.75 mm. wide across the base; stamens 5, alternating with the petals, erect; the glabrous filaments 0.75 mm. long; the 0.25 mm. long anther nearly as wide and introrse; ovary and gradually tapering style glabrous, the style falsely united into 2 parts and bearing a similarly united capitate stigma; mature capsules not seen.

Type specimen 7566, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906.

In light woods at 1800 feet on mount Banahao. The foliage appears very similar to some Philippine species of *Maesa*.

It is only distantly related to *I. chinensis H.* and *A.* and has differently shaped leaves, all parts wholly glabrous, petals reflexed not depressed to the fruit and with much shorter stamens.

2. **I. luzonensis Elm.** n. sp.

Large shrub or small tree; bark gray; branches rigid. Leaves also rigid, alternate, scattered along the glabrous twigs, ovate or sometimes oblong or the smaller ones subelliptic, quite variable in size, the average larger ones 16 cm. long

by one half that in width, base rounded or obtuse, apex acute or obtuse, margins entire or obscurely denticulate, the brown 3 to 5 ascendingly arched pairs of nerves prominent beneath, lucid green above, much paler beneath, glabrous, reticulations and cross bars very faint; petiole very thick, glabrous, 1.5 to 2 cm. long, usually recurved. Inflorescence axillary or more frequently 1 to 3 or even 5-clustered in the axils of fallen leaves, the spicate racemes varying from 1 to 2 dm. in length; glabrous pedicels 3 mm. long, slender, usually arranged in small clusters; calyx turbinate at the base, the rim 3 mm. in diameter, glabrous, 5-toothed or apiculate; petals alternating with the calyx segments, 3 mm. long, 1 mm. wide at the base, gradually tapering to the acuminate apex, subpersistent and reflexed with age; glabrous filaments slender, 1.5 mm. long; anther 0.3 mm. long, nearly as broad, introrse; ovary glabrous, conical and terminating into a short style, falsely united into 2 carpels; stigma terminal and disk like; capsule 4 mm. long, glabrous, splitting from the base but usually the stigma keeping intact; seeds black, linear, 2.5 mm. long.

Type specimen 7484, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906.

In sparse woods skirting the base of mount Banahao at 2400 feet.

Apparently it differs from *I. macrophylla Wall.* in its larger calyx rim, more acuminate corrolla segments, and much shorter capsules.

LEAFLETS OF PHILIPPINE BOTANY

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A FASCICLE OF SOUTH NEGROS FIGS

BY

A. D. E. ELMER.

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The following thirty four species and one variety of figs were collected in the Cuernos mountains, province of Negros Oriental, from March to June of 1908. The base for my camp work was made in a small settlement officially called Luzuriaga (formerly Valencia), a distance of about four or five miles westward from the beautiful little seacoast town of Dumaguete. In this collection of figs are five new species, only two, however, are here collected for the first time. One new variety is described and another varietal name is raised to specific rank. All except one seacoast species were collected within the altitudinal range from 1000 feet to the summit of the highest peak, or a few hundred over 6000 feet. From this altitude one can look over the further interior mountainous sections extending to the northwest, the Sulu sea lying stretched before the observer to the west, the waters around the southern point of the island and up toward Dumaguete which lies almost due east from this group of mountains. On clear days the Malindang mountains of northwestern Mindanao are plainly in sight. Looking west over the northern portion of Siquijor island one occasionally sees the three peaks or volcanoes on Camiguin island. In the direction of Cebu the

eye equally encompasses both the eastern and western coast for about one third of its southern portion. The table lands of Bohol are also visible.

Nearly all my collecting was done along the Bonyao river which heads at the foot of the perpendicular north-eastern side of the mountain; and along the ridges and spurs to the south and north of this river. There is an old beaten but steep and rough trail up the southern spur clear to the highest peak. The trail leading up the northern spur or ridge is not as steep and leads through some fine woods from 3500 to 4500 feet. At about 4000 feet elevation is a splendid spring right on the trail and in very humid woods. This trail terminates on the lesser peak which is about 750 feet below the highest one. The highest peak lies to the south of the lesser one and there is no trail connection over the rather sharp deep depression between them.

The prevailing winds are from the Sulu sea toward the north-east. During the monsoon season occasionally the winds blow from the opposite direction and are usually more stormy. The climate for the entire year is said to be comparatively uniform. March, April, May, and June have the least rain. Even during these months there is a great deal of fog rolling in over the mountains from the Sulu sea. The lowest limit of this fog altitude on the Dumaguete side is approximately at 3500 feet.

At this point the higher valley plants give way to an entirely new flora. Nowhere else in the Philippines have I encountered such an abrupt and complete change. Here the splendid tree ferns begin and extend clear to the summit. *Freycinetia negrosensis Merr.*, *Polygala venenosa Juss.*, monstrous trees of *Agathis philippinensis Warb.*, a few new species of *Macaranga*, *Ficus disticha Blm.* abound, and are nearly all limited to within a 1000 feet altitudinal range. Many other species of this altitude extend much higher if not quite to the summit. Others give way to closely allied forms at the top. In other words, the flora from 3500 feet up to the summit has a striking unity when compared with that below said elevation. The summit vegetation is dense in *Freycinetia* jungles and rigid interlaced shrubs, profusely rich in scale mosses. The latter loosely cover everything. On the larger limbs of spreading trees they form big clumps, twigs the size of a man's finger they clothe until they

have the appearance of being six inches thick; and on the ground they form mats knee deep. The summit of the highest peak has a shallow triangularly shaped depression of about two acres in area. This depression may be the vestige of an old crater, and is densely filled with shrubs and with some scattering big trees of *Myrica javanica Blm.*

In this place was found *Ficus benguetensis negrosensis Elm.* Further down in one of the gulches *Ficus cuernosensis Elm.* and *Ficus cervina Elm.* were discovered. At about 4000 feet the following already known species of figs were collected. *Ficus indica Linn., F. integrifolia Elm., F. apiocarpa Miq., F. puncticulata Merr., F. propinqua Merr., F. bataanensis Merr., F. guyeri Elm., F. lucbanensis Elm., F. disticha Blm.* The balance of *Ficus* enumerated in this fascicle were collected below 3500 feet altitude.

Along the coast inwardly to Luzuriaga the country is chiefly covered with cocoanut groves, occasionally interspersed with sugar cane ranches. About Luzuriaga and some distance above this barrio there is quite an acreage planted in corn, although the yield is said to be generally poor. Then the "Abaca" or Manila hemp fields begin, especially in the alluvial soils along the river and larger tributaries. At about 2500 feet in the lower portion of the ravines the hemp is at its best, although it is also planted upon ridges and in favorably sheltered places it is successfully grown as high as 3500 feet.

SYNOPSIS OF THE SECTIONS.

A. Pseudo-hermaphrodite; male flowers with 1 stamen and a rudimentary pistil. Pseudo-hermaphrodite flowers and gall flowers in one set of receptacles; fertile female flowers in another set.

1. *Palaeomorphe.*

AA. Unisexual or asexual; male flowers without rudimentary pistils.

B. Male, gall, and fertile female flowers on the same receptacles.

2. *Urostigma.*

BB. Flowers unisexual or neuter; male and gall flowers on one set of receptacles, fertile female

and neutral flowers in another set.
3. *Synoecia.*

BBB. Flowers unisexual; male and gall flowers in one set of receptacles, fertile female flowers only in another set.
C. Flowers monandrous.
D. Unbranched palmlike shrubs.
4. *Pseudopalma.*
DD. Branched shrubs or trees.
E. Receptacles axillary.
5. *Sycidium.*
EE. Receptacles mostly in fascicles from stem and branches.
6. *Covellia.*
CC. Flowers di- rarely tri-androus.
D. Receptacles mostly axillary.
7. *Eusyce.*
DD. Receptacles mostly in fascicles from stem and branches.
8. *Neomorphe.*

1. PALAEOMORPHE.

Ficus pisifera Wall. Cat. 4504, 1828.

Specimen 9491, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

A sprawling shrub or subscandent in habit, tightly cleaving to its support. Figs small, in clusters of the leaf axils, turning yellowish and ultimately becoming soft and very dark wine red. *F. celebica Miq.* is very much like this species and what the distinctive characters are is not clear to me. "Pilig" is the vernacular name.

Ficus caudatifolia Warb. in *Perkin's* Frag. Fl. Philip. 194, 1905.

Specimen 10104, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

Typical, rare in our locality in damp woods at 4000 feet. Much branched and scandent upon large tree trunks as high

as 8 meters. As in other localities, it is heavily loaded with figs.

Ficus irisana Elm. Leaf. Philip. Bot. 1; 45, 1906.

Specimen 9594, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

A small tree with spreading branches in well drained soil of thickets on a ridge at 3000 feet. Only one or two plants were observed.

In the field it is at once distinguished by its large fruits from *F. quercifolia humilis* (*Roxb.*) *King*, a common valley species. Typical *F. irisana Elm.* has broader leaves with obliquely rounded emarginate bases. "Pili-nadako."

Ficus inequifolia Elm. Leaf. Philip. Bot. 1; 242, 1907.

Specimen 9490, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

Previously known only from the type locality. Leaves and angled twigs rigid. Figs hard and lemon yellow, soft and apple red when fully mature. In our locality it is more of a shrub than a tree. The natives call it "Dalakit."

Ficus confusa Elm. Leaf. Philip. Bot. 1; 47, 1906.

Specimen 9697, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

Widely distributed in the Philippines. Probably it should be referred to *F. philippinensis Miq.*, but our specimens have larger fruits, larger more membranous leaves and longer petioles. Visayan name "Pili-na-balagon."

Ficus anomala Merr. in Philip. Journ. Sci. 1, Suppl. 3; 183, 1906.

Specimen 9767, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

An erect 8 m. high tree in open dry woods of well drained ridges at 1200 feet. Only one tree was found. The Visayans call it "Alang-as."

The author of this species thinks it identical to *F. decussata*

Warb., but how the latter species differs from *F. heteropoda Miq.* still remains obscure to me. Possibly both of them must in time be referred to *Miquel's* name.

2. UROSTIGMA.

Ficus indica Linn. Sp. Pl. ed. 2, pt. 2; 1514 (in part), 1762-3.

Specimen 10153, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

A big lofty tree with large spreading branches in damp woods near a spring at 4000 feet. These are the least typical specimens I have ever collected in the Philippine Islands. Only one tree was observed.

Ficus hallieri Merr. in herbarium, Bureau of Science.

Specimen 10142, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

Large tree, with widely spreading branches, ultimate branches rather slender and lax. Leaves coriaceous, flat, subhorizontally spreading, dark green above, much paler beneath, the conspicuous veins yellowish white. Figs ascending, usually in pairs from the leaf axils, yellowish green when collected with light colored spots beneath the fuzzy pubescence, globose, 3 cm. thick.

Rare in deep gorges of the Bonyao river at 3000 feet.

This species belongs to the *F. chrysolepis Miq.* group. It is very near if not identical with my number 9375 from Lucban, province of Tayabas, Luzon, and which in the Leaflets on page 246 I erroneously referred to *F. malunuensis Warb.* The latter species has affinities to *F. gigantifolia Merr.*

Type specimen collected by *Dr. H. Hallier*, San Ramon, Province of Zamboanga, Mindanao, February, 1904. Named after the discoverer.

Ficus bataanensis Merr. in Philip. Journ. Sci. Suppl. 1; 46, 1906.

Specimen 9810, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

Tree, 20 m. high; trunk straight, 7 dm. thick; branches

spreading from the upper portion of the stem, the ultimate ones rather few and lax; wood moderately brittle, yellowish white, with conspicuous concentric rings; bark also brittle, brown and lenticelled, reddish on the inside. Leaves flat but gracefully recurved and spreading, rather stiff, dark lucid green above, yellowish green beneath, easily breaking. Figs usually in pairs from the leaf axils, upon rusty green and usually recurved peduncles, the surface hard, smooth and rusty green, covered with minute yellowish white lenticels, globose, with a very conspicuous nipple-like umbilicus (reminding one of acorns), apparently turning yellowish when fully ripe.

Otherwise only known from mount Mariveles, Luzon, and mount Pulgar, Palawan. In damp woods at 4000 feet. Known to the natives as "Pili-ihalas."

Ficus nervosa Hey. in *Roth's* Nov. Spec. Pl. 338.

Specimen 10264, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

Tall tree with a long straight bole; stem 20 m. or longer, 9 to 12 dm. in diameter, strongly buttressed, covered with thick gray brittle bark; branches forming an elongated crown, rather dense and crookedly rebranched. Leaves chartaceous, flat, smooth and dull olive green on the upper side, lighter green beneath; ends of twigs, bud scales, and petioles covered with soft yellowish brown hairs and becoming nearly glabrous. Figs in pairs from the leaf axils, recurved upon the green peduncles which are subtended by 3 short green bracts with brown margins, less than 1.5 cm. thick, usually somewhat obovoid, shining green, with here and there lighter green spots; umbilicus flat, green, minute; syconium thick, whitish on the inner side; florets deep red.

In a deep canyon of the Bonyao river at 2000 feet. A Malayan and Indian species not previously reported from our Archipelago. This same form has also been collected in central Mindanao, middle Luzon, and on Mindoro.

Ficus saxophila Blm. Bijd. 437, 1825.

Specimen 9644, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

A tall and widely spreading tree; wood pale white, conspicuously ringed; bark smooth, mottled, very freely bleeding a viscid milk colored fluid; branchlets slender, half drooping. Leaves spreading from the suberect green petioles, subcoriaceous, lucid dark green and a trifle conduplicate on the upper side, much duller beneath, tips recurved, the nerves greenish white. Figs sessile, solitary or in pairs from the leaf axils, globose, 1 cm. in diameter, yellowish green, but apparently turning reddish when fully mature; florets brown.

Only one tree was observed along the Bonyao river at 1000 feet. Previously only known by *R. Meyer's* collection from the Lamao river, province of Bataan, Luzon, (Forestry Bureau record 2588). Its range outside the Philippines extends over Java, Timar and Boeroe. The leaves of our specimens are ovate to cordate, not ovate to oblong, coriaceous not membranous and generally larger. The figs apparently are also larger, subtended by truncate or squarrose bracts, with a depressed umbilicus, not at all pointed. Known to the natives as "Balitarhan."

Ficus everettii Elm. n. sp.

Large tree, 20 m. high; branches spreading, rigid; twigs glabrous, more or less angular. Leaves flat, rigid, alternatingly arranged along the branchlets, 1 dm. long, 5 cm. wide, oblong to obovate, apex mostly rounded or occasionally obtuse, entire, base cuneate, lucid green, slightly paler beneath, glabrous; midnerve very prominent beneath, grooved on the upper side, very pale green; the lateral ones rather fine, submarginally united, the lower pair arising from the base, about 7 pairs, although frequently secondary ones occur nearly as conspicuous, reticulations few and obscure; petiole glabrous, 2 to 3 cm. long, stout, caniculate along the upper surface, becoming easily detached; bud scale 2.5 cm. long, nearly 1 cm. wide at the base, rigid, brown, glabrous, sharply acuminate.

Receptacle sessile in the leaf axils, chiefly in pairs, the fully grown ones 2 cm. long and 12 mm. thick, oblongish in outline or obscurely pyriform or obovoid, both ends similarly subtruncate, suberect, the apex nearly always suboblique, smooth, hard, light pleasing red; umbilicus annular, yel-

lowish, the scales dark brown and not protruding; involucral bracts 3, smooth, chestnut brown, persistent, imbricate at the base, ovately triangular, about 5 mm. long, each fruit provided on the outer lower side with an additional bract; staminate flowers among the umbilical scales, 3.5 mm. long, the lower two thirds pedunculate, the upper portion obovoid, monandrous; perianth snugly overarching the anther, dark brown, rather rigid, ultimately separating into 4 obovate segments; filament very slender; anther 1.33 mm. long, broadly elliptic; inner side of syconium provided with sparse chaffy scales 1 mm. long; gall flowers mostly sessile, irregularly ovate, nearly 3 mm. long, dark brown, closely enveloped by 3 similarly colored 2 mm. long involucral acute bracts; style straight, nearly terminal, 1 mm. long, oblique and deeper brown at the apex.

Type specimen 10254, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

This tree was found in a deep canyon filled with dense humid woods at 2750 feet. Related to but not identical with the following species:

F. balete Merr.	*F. vidalliana Warb.*
F. altissima Blm.	*F. forstenii Miq.*
F. clementis Merr.	*F. clusioides Miq.*
F. palawanensis Merr.	*F. indica Linn.*

This same species was collected in May, 1906, province of Negros Occidental, by *H. D. Everett*, (Forestry Bureau record 4264). Named in honor and in commemoration of *Mr. Everett* of the Forestry Bureau who collected many interesting plants on the island of Negros and who lost his life at the hands of the natives while crossing the mountains of southern Negros in June of 1908.

3. SYNOECIA.

Ficus apiocarpa Miq. in Ann. Mus. Lugd. Bat. 3; 269 and 289, 1863-9. *Urostigma apiocarpa Miq.* l. c. 410.

Specimen 10232, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

Leaves quite variable at least in size upon the same plant, but more uniformly elongated acuminate than in my

number 7445 from Lucban, Tayabas province, Luzon. However, the shape of the fruits of both these collections is similarly ellipsoid (ovoid?), not at all pyriform. *F. apiocarpa Miq.* is applied to the form with pear shaped figs, and to the other form *Miquel* applied the name *F. tetangis*. Possibly the two forms are specifically separable and that our Philippine species must be referred under the latter name. Our species in this locality is common at 2500 to 3500 feet, and is a powerful tree climber.

4. PSEUDOPALMA.

Ficus pseudopalma Blco. Fl. Filip. ed. 1; 680, 1837.

Specimen 10318, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

In shrubberies of hot dry ridges at 1200 feet. It is the rank coarse species of middle Luzon. I do not know *F. haenkei Warb.*, which, if in this group, is the third Philippine species and the smallest of them all.

5. SYCIDIUM.

Ficus guyeri Elm. Leaf. Philip. Bot. 1; 196, 1906.

Specimen 9460, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

In damp dense woods at 4000 feet. Here not common. This also bears the vernacular name "Pili."

Ficus rudis Miq. Ann. Mus. Lugd. Bat. 3; 222 and 291, 1863-9.

Represented by 10144 and 10171, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

I should judge our specimens to be nearly typical. Outside of Negros it has also been collected in southern Luzon, on the island of Ticao and in central Mindanao. Originally known from the Celebes and Kei.

Ficus fiskei Elm. Leaf. Philip. Bot. 1; 195, 1906.

Specimen 10371, *A. D. E. Elmer*, Dumaguete, Cuernos

Mountains, Province of Negros Oriental, Negros, June, 1908.

A shrub in thickets on dry hot banks of the Bonyao river at 1200 feet. In this locality not at all common. So far its range extends from middle Luzon southward through Leyte.

Ficus lucbanensis Elm. Leaf. Philip. Bot. 1; 254, 1908.

Specimen 9454, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

Collected in damp woods near a spring at 4000 feet. To me it does not seem typical. See remarks under *F. benguetensis negrosensis Elm.*

Ficus hauili Blco. Fl. Filip. ed. 1; 884, 1837.

Specimen 10430, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

This is probably the commonest species in the Philippines and has the most extensive range latitudinally and altitudinally. Known to some of the Tagalogs as "Hauili."

How *F. didymophylla Warb.* differs from this earlier species is not yet clear to me. Probably *Warburg's* species should be considered as a synonym of *Blanco's* name.

Ficus quercifolia humilis (Roxb.) King in Ann. Roy. Bot. Gard. Calc. 1; 78, 1887.

Specimen 9507, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

Very common in thickets and light woods along streams and in low bamboo gulches at 1000 feet.

My number 7179 from Palo, Leyte, is the same species. But 7447 from Lucban, Tayabas province, Luzon, and which I referred under this same name on page 251 of the Leaflets, is a small leaved form of *F. blepharostoma Warb.* That numbers 7179 and 9507 are *F. cumingii Miq.*, I am not quite ready to admit. *Dr. Warburg* also found rudimentary ovaries in the staminate flowers of his specimens. See *Perkin's* Frag. Fl. Philip. 198, 1905. "Pili" is the vernacular name.

Ficus benguetensis negrosensis Elm. n. var.

Tree, 8 m. high or less, with straight 2 dm. thick stems; wood whitish, very soft, covered with brown more or less lenticelled bark; branches divaricate, quite slender. Leaves alternate along the terminal portion of the branchlets, submembranous, flat, horizontally spreading, oblong, nearly 2 dm. long, 8 cm. wide across the middle, apex gradually acute, entire, or obscurely undulate toward the apex, glabrous on both sides, beneath finely sprinkled with white dots, base rounded or obtuse; petiole 2 to 3 cm. long, at first like the younger portion of the twigs yellowish brown pubescent but soon wearing glabrous; nerves drying brown, ascendingly curved, 5 to 7 lateral pairs, the tips more or less distinctly united, prominent beneath, cross bars comparatively prominent, reticulations obscure; bud scale 2 cm. long, acuminate, short yellowish pubescent on the back, outer margins and ventral side glabrous.

Receptacles subsessile, solitary or in pairs from the leaf axils, reddish and shining when mature except the lenticels, occasionally bracteate, usually obovoid in shape, 1.5 cm. long, subsessile, subtended by 3 rather rigid involucral bracts, very rugose in the dry state; umbilicus quite prominent; flowers only fertile female; pedicel 1.5 mm. long; gamophyllus perianth equalling the pedicel, obliquely truncate; ovary obovoid, 1 mm. thick; style subterminal, 1.5 mm. long at most, glabrous or provided with a few short scattering hairs toward the stigma.

Type specimen 9730, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

Erect tree in the shallow wooded crater of the summit. Differs from typical specimens in the larger membranous leaves, much longer petioles; figs subsessile, solitary or in pairs from the leaf axils, very rugose when dry. This condition of the dry fruits is the same as in *F. cuernosensis Elm.*, and the florets are very similar also. There is still another small leaved form with long pedunculate fruits in the high mountains of middle northern Luzon. (See Forestry Bureau record 5007, collected by *H. M. Curran*, on mount Tonglon, province of Benguet; and 5744, collected by *W. Klemme*, district of Lepanto. Judging by leaves alone it is very dif-

ficult to distinguish *F. hauili Blco.*, *F. benguetensis Merr.*, *F. lucbanensis Elm.*, but mature fruits, especially in the fresh state, separate them at once. The two varieties are more difficult to distinguish. A more distant relative of *F. benguetensis Merr.* is *F. carpenteriana Elm.* of Leyte and Mindanao.

6. COVELLIA.

Ficus minahassae Miq. in Ann. Mus. Lugd. Bat. 3; 231 and 296, 1836-9.

Specimen 10213, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

In my opinion, this very oddly characteristic species should be relegated into a monotypic section. So far, we know of no other species that resembles it in the least.

Ficus satterthwaitei Elm. Leaf. Philip. Bot. 1; 199, 1906.

Represented by numbers 9469, 9863 and 10211, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, April and May respectively, 1908.

Quite common here from 1500 to 2500 feet altitude. Variable as 9863 will indicate when compared with 7181 from Eastern Leyte, the type locality. So far not known from other localities. Local name "Tabugoi."

Ficus heteropoda Miq. Ann. Mus. Lugd. Bat. 3; 232, 1867.

Specimen 10431, *A. D. E. Elmer*, Dumaguete, Province of Negros Oriental, Negros, June, 1908.

Dr. Warburg distinguishes his *F. blepharostoma* from this species by the alternate leaves and axillary fruits. It was previously collected by me in eastern Leyte and should not be confused with *Warburg's* species. Here at Dumaguete, as in Leyte, it was found along the coast.

Ficus cervina Elm. n. sp.

Tree, 7 m. high; branches laxly spreading, those of the comparatively short and numerous twigs clothed with yellowish brown hairs; wood white, soft, light; bark mostly gray. Leaves subchartaceous, flat, somewhat descending, with strongly recurved

tips, dark green above, yellowish so beneath, subfalcate, oblanceolately oblong, strongly inequilateral, tips slenderly acuminate, cuneate at the base, alternate, rather numerous toward the end of the branchlets, variable as to size, the larger blades 1 dm. long, 3 cm. wide just a trifle above the middle, dark tawny when dry, glabrous above, soft dark yellowish brown pubescent beneath; petiole less than 5 mm. long, densely pubescent with yellowish brown hairs; nerves conspicuous beneath, ascendingly curved, 5 to 7 or even as many as 9 lateral pairs, the fine reticulations quite evident beneath; bud scale 5 to 10 mm. long, acuminate, the outside covered with similarly colored hairs.

Receptacles upon slender branched tubercles from 5 cm. to 5 dm. long and which arise from the roots or from the basal portion of the stems and lying upon the ground, dark green, with yellowish brown excrescences or lenticels, usually in small clusters of 3, subglobose, 12 mm. in diameter; peduncle 3 to 5 or even 8 mm. long, when young short brown pubescent; involucral bracts short, similarly pubescent, terminating the peduncle; the inner surface of the syconium provided with dark brown 1 mm. long bristles; flowers gall and male only; the staminate ones scattered in a circle immediately beneath the umbilical scales, 2 mm. long, obovoid, upon a 0.75 mm. long pedicel; the solitary stamen covered over with a brown glabrous gamophyllus perianth; filament 0.5 mm. long, comparatively thick; anther nearly 1 mm. long, nearly as broad, truncate at both ends; gall flowers 3 mm. long including the 1 mm. long smooth brown pedicel or the younger ones subsessile, obliquely ellipsoid, deep brown, 1.5 mm. in diameter, without a perianth; style subterminal, very short, bearing an obscurely lobed disk like stigma.

Type specimen 10179, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

One tree was found on a steep side of a densely wooded spur at 3500 feet.

Its affinities are with *F. linearifolia Elm.* but the leaves are much smaller and comparatively broader, and with much shorter branched tubercles.

Ficus cuernosensis Elm. n. sp.

Stocky tree, 6 m. high; branches rigid, twigs gnarly, the younger portion yellowish brown tomentose; old bark thick, brown or mottled, roughened with reddish colored lenticels. Leaves more or less clustered toward the ends of the twigs, chiefly alternate, submembranous, much paler green beneath, flat, spreading, unequal in size, the normal blades 14 cm. long, 7 cm. wide across the middle, oblong, entire, apex usually abruptly acute, base usually subinequilaterally obtuse or rounded, glabrous above, beneath occasionally strigose on the nerves; petiole 1 to 3 cm. long, yellowish brown pubescent, with age becoming glabrous; nerves prominent beneath, drying brown, quite visible from the upper side, the 5 to 7 lateral pairs ascendingly curved, tips anastomosing, the lower pair arising from the base, the reticulations very plain from both sides; bud scales nearly 2 cm. long, brown pubescent on the back only.

Receptacles clustered upon 2 to 5 cm. long rigid woody branched tubercles upon the main branches but occasionally extending down along the stem, subglobose or frequently somewhat ellipsoid, dull yellowish green when mature, very much roughened by brown raised lenticels, rugose in the dry state; umbilicus large, raised; peduncle less than 5 mm. long, terminated by 3 short acute involucral bracts; flowers apparently fertile female only; pedicel at least 1 mm. long, curved, enclosed by an equally long truncate gamophyllous perianth; ovary ellipsoid or angularly obovoid, 1.5 mm. long, 1 mm. thick, finely punctate, reddish brown; style about as long as the ovary, sublateral, straight or curved upon itself, glabrous or with scattering strigose hairs, terminated by a slightly enlarged stigma; achenes flattened, mostly a trifle oblong in shape, light brown or yellowish brown, keeled.

Type specimen 9496, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

A stocky tree in water worn gulches of the fog belt at 4500 feet. Rare, only two trees were observed in the same place. The natives know it as "Tabugay".

Not having staminate flowers there still remains doubt as to whether it belongs to *Covellia* or to *Neomorphe*.

7. EUSYCE.

Ficus propinqua Merr. in Govt. Lab., Publ. 20; 8, 1905.

Specimen 9811, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

This material is typical and has not previously been collected as far south.

Ficus odorata (Blco.) Merr. in Govt. Lab. Publ. 17; 15, 1904. *F. hispida odorata Blco.* Fl. Filip. ed. 1; 686, 1837: ed. 2; 476, 1845: ed. 3; 89, 1879.

Specimen 9563, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

Nowhere in the Philippines have I found this species more abundant than in this locality. Its altitudinal range is from the seacoast up to 3500 feet and usually is a dwarfed or burly appearing tree. "Ago-sahes" is the vernacular name.

Ficus disticha Blm. Bijd. 458, 1825.

Represented by specimens 9660, 10051, and 10429, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, May and June respectively, 1908.

A lofty and widely ramifying tree climber, inhabiting the woods at 4000 feet or the lower line of the fog belt.

It is reported to have a wide distribution in Java and Sumatra from 2500 to 6000 feet altitude. In our region it is quite common and most unvariable. Besides these specimens *Messrs. Curran* and *Merritt* also secured it on mount Banahao, province of Laguna, Luzon, (Forestry Bureau record 8010). "Tolog-tolog".

F. elliptica Miq. in Lond. Journ. Bot. 7; 440, 1848 is based on *Cuming* 1927 from the Philippines and which *Dr. King* in Ann. Roy. Bot. Gard. 1; 126, 1887 reduced to *F. disticha Blm. Miqeul's F. elliptica* is unquestionably a form of *F. megacarpa Merr.* by the texture, size and shape of the leaves. Since there is an older *F. elliptica*, that of *H., B. et K., Miquel's* name is invalidated.

Ficus paloensis Elm. n. comb. *F. ruficaulis paloense Elm.* Leaf. Philip. Bot. 1; 203, 1906.

Specimen 9834, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

Old tree, 10 m. high; stems 5 dm. thick, soon branching into main branches; ultimate branches few, thick, reclining and with suberect tips, often quite long; crown broadly umbrella shaped. Leaves strongly conduplicate on the upper surface which is lucid green, subcoriaceous or rather chartaceous; wood white, moderately soft, odorless; bark grayish white mottled, reddish brown on the twigs. Figs solitary or in pairs from the lower leaf axils, pendulous, obovoid, broadly elliptic to fusiform or pyriform, dull lemon yellow when fully mature, the larger ones 5 cm. long and similarly tapering toward both ends, with conical umbilicus, upon short thick green peduncles.

In light woods of the dry ridges at 2500 feet. Easily recognized in the field from *F. ruficaulis Merr.* by the much larger and differently shaped fruits and also by leaf characters.

Ficus puncticulata Merr. in Philip. Journ. Sci. 3, Sect. C; 131, 1908.

Specimen 9689, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

A lofty tree climber on ridges at 3500 feet; stems flexible, 3 cm. thick, frequently flattened and obscurely grooved on the sides; bark brown and gray mottled, minutely lenticelled. Leaves chartaceous, dull green, paler beneath, erect from the brown comparatively thick petioles, but otherwise strongly recurved. Figs dirty yellowish or greenish yellow, subglobose, both ends similarly flattened, densely covered with minute lighter yellow colored lenticels; umbilicus minute, sunken, annular. "Pili-na-balagon" is the Visayan name and means a climbing fig.

Our specimen differs from *F. scandens Roxb.* by the glabrous subsessile fruits. How they compare with *F. hederacea* and *F. fruticosa* of the same author is not yet clear, but from *King's* discussion it is apparent that the latter has a different habit, and, being depicted as diandrous, belongs to

the section *Sycidium*. The leaves are larger than in *Merrill's* species and fairly well match *F. tayabensis Elm.*, but the fruits are subsessile at least and subtended by 3 brown bracts which are nearly obsolete in my number 8266 from Lucban. So far only collected in central Mindanao, the type locality.

Ficus crassitora Elm. n. sp.

A slender tree, 10 to 15 m. high; stem 2 to 3 dm. thick; the main branches arising from above the middle, divaricately spreading; wood white, bark mottled; twigs lax, glabrous. Leaves coriaceous, flat or recurved toward the tip, dull and dark green above, yellowish green beneath, alternate, entire, elongated oblong, 12 to 15 cm. long, 3 to 5 cm. wide across the middle, similarly tapering toward both ends, the point of the apex blunt, leaving large scars after falling; petiole stout, 1 cm. long, glabrous, caniculate on the upper side; midnerve very conspicuous beneath and frequently strigose especially in the early stage, somewhat grooved on the upper side; the lateral 7 to 9 pairs comparatively prominent beneath, divaricate, united 3 to 5 mm. from the margin, reticulations very evident beneath; bud scales 3 cm. long, subfalcate, slenderly and sharply acuminate, yellowish gray strigose on the back, brown and glabrous on the ventral surface.

Receptacles usually solitary from the upper leaf axils, hard, smooth, subglobose, 2 to 3 cm. in diameter, apparently turning apple red when fully mature and if exposed to the sun; the torus very thick; peduncle more or less 5 mm. long, pulverulent or glabrous, ebracteate; umbilicus flat, small, sunken; individual flowers of 3 kinds, all light red; staminate flowers diandrous, few, concealed beneath the umbilicus, 2.5 mm. long including the short thick pedicel; its perianth much exceeding the stamens, ultimately 3 to 5-segmented; filaments 0.5 mm. long, glabrous, confluent at the base; anthers as long, broadly ellipsoid; gall flowers of 2 distinct types; the primary ones 4.5 mm. long, sparse, upon a 2.5 mm. long pedicel; its perianth of 3 oblong 1.5 mm. long deep brown segments; insect ovary yellowish or straw color, broadly ellipsoid, 1.25 mm. long, sessile; style arising from the middle of the ovary, upwardly curved over

the ovary, at least 1 mm. long, slightly thicker and deeper brown toward the apex; secondary gall flowers more numerous, sessile, clustered about the primary ones; its perianth lighter brown, of 3 pieces, 4 mm. long, the upper one half extending into very slender tails; yellowish ovary flattened, oblong, 1.25 mm. long, 0.75 mm. wide; style very slender, yellowish brown except the slightly thickened brown stigmatic portion, lateral, 3 to 4 mm. long.

Type specimen 10032, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

First collected near the town of Palo, Mindoro, by *Sr. R. Garcia*, May, 1903. The only other typical specimens so far known from the Philippines is my own number 6866, collected in the woods on the trail one half mile above camp two, mount Mariveles, province of Bataan, Luzon, November, 1904. It is similar to the type of *F. similis Merr.* collected by *R. Meyer*, (Forestry Bureau record 3013 not 3031), but that species has smaller less coriaceous leaves; bracts only one half as long; and figs barely one half as large. Discovered in wooded ravines along the Bonyao river at 2500 feet. The tree is rather slender, with few but widely spreading branches. Flowers male and gall only, although of the latter there are two distinct types. It therefore belongs to *Eusyce* rather than to *Urostigma* to which *F. similis Merr.* was referred and to which our species is allied.

8. NEOMORPHE.

Ficus variegata Blm. Bijd. 459, 1825.

Specimen 10170, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

Scattered here and there as large trees with long ashy gray boles in ravines of light woods at 2000 feet altitude. The fruit is 3 to 5 times as large as in *F. latsoni Elm.*, is differently shaped and instead of turning to a deep yellow always remains green or a pale green. Between *F. nodosa Teysm.*, *F. roxburghii Wall.* and *F. variegata Blm.*, it agrees most closely with the latter species or to some of the other allied species considered by *Dr. King* as synonyms of *F.*

variegata Blm.

Ficus integrifolia Elm. Leaf. Philip. Bot. 1; 61, 1906.

Specimen 10215, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

Moderately large tree in humid woods near the spring at 4000 feet. Very rare in our locality. Specimens from northern and middle Luzon vary as to the glabrous and pubescent conditions of both the under side of the leaves and receptacles. Very pubescent forms approach *F. macropoda Miq.*, but that species has much smaller leaves. The leaves of my number 8487 from Benguet province, Luzon, exactly matches *Cuming's* 1933 from the Philippines and on which *Miquel* based his species.

Ficus garciae Elm. n. sp.

Large tree, 15 m. high, with a widely spreading crown; the main branches large, the ultimate ones slender, the young portion subglabrous and yellowish; wood soft, dull white, light; bark thick, reddish except the rather smooth grayish coat. Leaves alternate, toward the ends of the twigs, submembranous, paler green beneath, variable in size, nearly flat, horizontally spreading, entire or the larger ones frequently coarsely toothed above the middle, glabrous, when dry dull brown above and greenish beneath, ovately elongated or elliptic, the upper one half gradually tapering to the acuminate point, base obtuse or broadly rounded, never cordate or even emarginate, the larger blades 2 dm. long, 8 cm. wide; nerves much lighter in color, prominent beneath, glabrous, divaricate, the 9 to 11 lateral pairs parallel, tips anastomosing, the basal pair arising from the base and ascending, cross bars faint; petiole slender, glabrous, 2 to 5 cm. long or longer; bud scale not exceeding 1 cm. in length, acuminate, finely cinereous through the middle portion of the back side, otherwise glabrous.

Receptacles upon 2 to 5 cm. long very rigid and branched woody tubercles, hanging in dense clusters, upon the larger limbs, 3 cm. in diameter, streaked with apple red from the apex, obovoid, apex flattened or shallowly depressed; peduncle 3 to 5 cm. long, glabrous, bearing at the

distal end 3 very small acute bracts; flowers apparently only fertile female, 3 mm. long, the basal 1.5 mm. pedunculate; the peduncle subtended by linear lanceolate, dark brown, rather rigid bracts which are either solitary and free or 3 and more or less united at the base, frequently unequal in width and length; ovary proper 1.5 mm. long, obovoid, dark brown, sessile, at the base subtended by 2 or 3 subfalcate linear and sharply pointed 0.75 mm. long bracteoles; style arising from the middle of the ovary side, 1.5 mm. long, rather straight, the basal one half very slender and brown, clavately thickened above the middle and yellowish.

Type specimen 9486, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

Tree, with widely spreading main branches, in light woods at 3000 feet. Only known from two other Luzon collections of my distributions: 8835 from Baguio, Benguet province and 9379 from Lucban, Tayabas province.

In the Leaflets on page 260 I considered it *F. glomerata Roxb.*, but the leaves in our Philippine form are long petioled, not subsemicordate, nor cuspidate, and not particularly rough on the upper side. Fruits not upon long, procumbent or drooping decompound, cauline, leafless branches. Bark of the young shoots not rough nor hairy. Named with pleasure, after *Sr. S. Garcia*, who has discovered quite a number of Philippine plants new to science. Known to the Visayan as "Talo-ot". For description of male and gall flowers see page 261 of the Leaflets based on the number 9379 and in said article referred to *F. glomerata Roxb.* It is exactly this species.

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LEAFLETS OF PHILIPPINE BOTANY

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GESNERACEAE FROM THE CUERNOS MTS.

BY

A. D. E. ELMER.

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Occasionally a botanical collector gets into a region in which certain groups of plants are unusually abundant, not ordinarily abundant in individuals as in temperate regions, but abundant in species and vice versa. In these islands we have some striking examples. For instance, the *Freycinetia* in the vicinity of Lucban (see article 11 of the Leaflets, page 212); the *Orchidaceae* on mount Halcon, Mindoro (see Philip. Journ. Sci. 2, Sect. C, page 311). Most of our botanical material of *Dipterocarpaceae* comes in from the narrowed southern portion of Luzon. Again, there is no place in the Philippines so rich in species of *Schefflera* as the lake Lanao region of central Mindanao. In no other locality have I collected as many species of *Zingiberaceae* and of scale mosses as in the Cuernos mountains of south Negros Oriental.

Equally interesting and abundant are the *Gesneraceae* in these same mountains. So far as I know, in no other locality in our Archipelago have so many kinds been collected. The members of this family are very fascinating to most collectors, and certain denizens are extraordinarily ornamental in their native haunts. Not so pleasing when a person tries to preserve their beauty in

the dry state, since many of them are exceptionally hard to cure, and despite of everything possible being done, they turn black or otherwise discolor so badly as to give no conception of their beauty. The habitation of the entire group, as far as the Philippines are concerned, is a very characteristic one. They thrive in the humid, well shaded woods at middle elevations and along the stream beds. A few species flourish best from 6000 to 8000 feet altitude, and some extend along very sheltered and deeply shaded creek bottoms nearly to sea level. Judging from their selected places of growth, nearly all species can be expected to contain a good deal of water or at least are in need of much moisture. Some of them grow only upon cliffs under the spray or within the spray of waterfalls. They are either herbs, vines or shrubs. From field observation, the flowers are comparatively showy, delicate in texture, and shed rather early. In color they vary from pure white to creamy white or even yellow, bright deep blue, cardinal to dark brick red. Some of the flowers are pinkish or whitish and streaked or spotted with red. The majority of Philippine species prove new to science, and out of the following seventeen species below enumerated, eight are here described for the first time. It should be remembered that six of the nine already known species are endemic to the Philippines, and have only in recent years been discovered and published.

CYRTANDRA Forst.

Cyrtandra cumingii Clarke in *DC.* Monog. Phan. 5; 263, 1883.

This common Philippine species was collected in moist soil in woods at 3000 feet. It usually grows in small clusters in very damp soil of deeply shaded places. The limp and heavy leaves are hard to dry and warp considerably in the process. The rather large flowers are whitish, sprinkled with purple. The showy bracts are yellowish white, usually purplish toward the ends especially in age. The fruits are watery white.

Specimen 10154, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

Cyrtandra lobbi Clarke in *DC.* Monog. Phan. 5; 282, 1883.

Lax, 2 m. high shrub; bark greenish, ultimately becoming thinly checked; wood soft, easily breaking. Leaves flat, coriaceous, dull green above, the petioles and nerves beneath sprinkled with brownish hairs. Bracts and calyx also green and provided with similarly colored hairs; corolla delicate, subpendulous, pure white, 3 cm. long, 2 cm. across at the throat, the saccate tube constricted below the middle.

Specimens 9659 and 10443, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March and June respectively, 1908.

Scattered as an undershrub throughout the humid woods at 2750 feet. The flowers are rather showy, but not numerous. The leaves are hard to dry and usually warp considerably while curing. "Hand-dulumg-og".

Cyrtandra tayabensis Elm. Leaf. Philip. Bot. 1; 347, 1908.

Stems less sparingly branched than in the type, the branchlets subdeflexed; wood soft, green, watery and easily breaking, covered with yellowish bark. Leaves spreading, coriaceous, flat, dark green above, much lighter beneath, the petiole and midrib frequently reddish. Pedicels also reddish, calyx green; corolla strongly recurved from below the middle, 3 cm. long, of a dull brick red throughout, constricted below the middle.

Specimen 9585, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

Abundant in moist woods at 4250 feet. Our plant forms loose tangled bushes upon small trees or large shrubs 3 to 5 meters from the ground. In some characters, notably the color of the flowers, it does not exactly match typical specimens from Tayabas province, Luzon. "Ling-nato-boto."

Cyrtandra villosissima Merr. in Philip. Journ. Sci. 1, Suppl. 3; 225, 1906.

A straggling shrub; old stems 3 cm. thick, moderately rigid, with a large pith, sparingly and crookedly branched; old bark thin, yellowish gray, green beneath the epidermis,

smoothish and ultimately becoming longitudinally checked; wood sappy. Leaves very diverse in size, limp, yellowish green above, whitish beneath due to the color of the hairs. Flowers divaricate, spreading from the axillary involucre, blood red or somewhat paler below the middle, the corolla segments rotately spreading.

Specimen 9511, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

Quite common from 2000 to 4000 feet and strictly confines itself to steep well shaded shrubby jungles or upon seepage ledges near water courses. "No-og-no-og" in Visayan.

Cyrtandra maesaifolia Elm. n. sp.

A low lax and widely branched shrub, 1 to 2 m. high; stems and branches easily breaking, smooth, greenish; the twigs obscurely zigzag, the young parts olivaceous pubescent. Leaves coriaceous, horizontally spreading, dark green and glabrous on the upper surface, much paler beneath, the lower side more or less concave and in the young state strigose, alternatingly scattered, oblong to obovate, rounded and abruptly tapering into the sharply acute apex, base obtuse or broadly cuneate, frequently inequilateral especially at the base, toward the apex serrately toothed, toward the base subentire or only apiculate, very unequal in size, the average blade 14 cm. long, 7 cm. wide across the middle or just above this; nerves ascending, the ends gradually curved and submarginally united, 5 to 7 pairs, prominent beneath and olivaceous pubescent; reticulations coarse and obscure; petiole 1.5 cm. long, caniculate, at first pubescent but soon wearing glabrous and scaly. Inflorescence axillary or leaf opposed; peduncles divaricate, 2 cm. long, strict, yellowish pubescent, occasionally 2 from the same axil; flowers 3 to 5 in a cluster; pedicels one half as long as the peduncles, similarly pubescent, subtended by a pair of yellowish green foliaceous bracts; bracts broadly lanceolate, 1 cm. long, finely pubescent on the outside; calyx 12 mm. long, yellowish white, hairy on the outside only; the 4 segments nearly divided to the base, lanceolate, rather abruptly terminating into a 5 mm. long point; corolla white except the purple sinuses, 2 cm. long, the basal glabrous portion tubular, the inflated portion soft strigose, comparatively straight; segments

broad, thin, nervose, the upper one bilobed and much shorter, the others united to above the end of the upper one; stamens didymous; filaments 2 mm. long, thin and glabrous at the basal 0.5 mm. long portion; the upper portion thick, worm like, glandularly pubescent, inserted on the inside of the corolla tube a trifle below the middle, far included; anthers 1.5 mm. long, dorsifixed; pistil thick, 8 mm. long, straight; ovary elongated, glabrous, arising from within the thick disk; style as long as the ovary, glandular pubescent, terminated by a knob like pubescent stigma; berry yellowish white, juicy, bitter, ovately elongated, 2 to 3 cm. long, bearing a prominent tip.

Type specimen 10228, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

Discovered in humid woods at 4000 feet and in our locality it is quite rare. Neither is it abundant elsewhere, since it has only come into collections from Canlaoan volcano and from lake Lanao of central Mindanao. The foliage reminds one of certain species of *Maesa*.

Cyrtandra fragilis Elm. n. sp.

A laxly branched shrub, 2 to 4 m. high; wood snappy, covered with a yellowish gray bark; twigs easily breaking, slender, the younger portion covered with dark brown hispidulous hairs. Leaves glabrous except the midnerve beneath, fragile, subcoriaceous, variable in size, numerous, horizontally spreading, oppositely arranged along the branchlets, flat, deep lucid green above, much paler or in the dry state sulphurescent green, lanceolate to oblanceolate, occasionally subfalcate and slightly inequilateral toward the base, entire, apex obtuse or acute with a blunt point, base long and cuneate or obtuse, the larger blades 4 cm. long, 12 mm. wide; nerves 3 to 5 pairs, ascendingly curved, faint but equally visible from both sides, the midnerve very prominent beneath and dirty puberulent; petiole less than 5 mm. in length, dark brown hispidulous. Flowers chiefly axillary, odorless, subpendulous, pinkish white, comparatively large; peduncles solitary, filiform, 1 cm. long, hispidulous, terminated by 2 short bracts; pedicels similar but usually with a reddish tinge, usually a trifle

shorter and becoming glabrous; calyx finely punctate, reddish, campanulate, glabrous, less than 5 mm. long, the 5 triangularly acute segments 2 mm. long and more or less callous tipped; corolla about 15 mm. long, 1 cm. wide across the throat, a trifle constricted just below the middle, inflated above this, glabrous; the 5 lobes broadly oblong, 3.5 mm. long, the lower one half of the throat longer; stamens didymous, 2 fertile, the 2 sterile ones remaining as 2 mm. long appendages, inserted a trifle below the middle of the corolla; filaments 5 mm. long, glabrous or only slightly glandularly hairy, strongly curved toward the place of attachment; anthers ovoid, 1 mm. long, scarcely reaching the throat; pistil 8 mm. long, strict, the oblong glabrous ovary subtended at the base by a cartilaginous rim, the neck gradually tapering and more or less glandular toward the top; stigma flat, 1 mm. in diameter; berry pendulous, juicy, easily falling out from the persistent calyx, dark wine or nearly black when ripe.

Type specimen 9917, *A. D. E. Elmer*, Dumaguete Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908. Also number 9502.

This same species has previously been collected on the Malindang mountains, province of Misamis, Mindanao, by *Maj. E. A. Mearns* and *W. I. Hutchinson*, May, 1906, (Forestry Bureau record 4753). Not rare in humid moss covered woods from 3500 to 5000 feet, and its slender branchlets readily break with a snap.

Allied to but not identical with *C. parvifolia Merr.*

Cyrtandra attenuata Elm. n. sp.

Stems decumbent, greenish, easily breaking, unbranched, sparingly 2 to 3 from the same root, rigid and suffrutescent toward the base; roots wiry, also rigid. Leaves ascending, opposite, spreading, chiefly confined toward the top of the stems, subcoriaceous, dark green and glabrous or only sparingly strigose on the upper surface, much paler beneath and glabrous except the veins, oblanceolate, much varying in size, acute at the apex, slenderly attenuate toward the base, 3 dm. long by 2 cm. wide above the middle but frequently much larger or smaller, margins toward the base subentire, otherwise serrately den-

tate; petiole 1 cm. long, covered with olivaceous hairs, occasionally the decurrent leaf margins extend clear to the base; nerves 5 to 7 or even 9 pairs, ascendingly curved, prominent and olivaceous pubescent beneath, the tips coarsely anastomosing; reticulations coarse, quite evident and also pubescent. Inflorescence axillary, ascending, solitary or in the robust forms 2 to 3-clustered upon short peduncles; the 2 or 3 involucral bracts olivaceous pubescent, about 1 cm. long, thin, oblongish with acuminate tips; pedicels also very short, hairy; calyx membranous, hairy, nearly 1.5 cm. long, trumpet shaped, oblique at the throat and usually slit down along the upper side; corolla white, saccate from the middle, delicate in texture, 3 to 5 cm. in length, 2.5 cm. wide at the throat, tubular below the middle, strigose except at the base, arising from a turbinate callous rim; the lobes broad, rotately spreading; fertile stamens 2, much included, inserted on the interior of the corolla a trifle below the middle; filaments glabrous, much flattened, 1 cm. long, merely curved; anthers 2 mm. long, dorsifixed, triangularly oblong; ovary glabrous, cylindric, 5 mm. long, 1.5 mm. thick; style nearly 2 cm. long, subcompressed, densely hairy; stigma 1 mm. high, 2.5 mm. wide, short and finely hairy; immature fruit cylindric, glabrous, 1 cm. long, 2 mm. thick.

Type specimen 9623, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

On seepage or dripping cliffs along the Bonyao river at 2500 feet. Quite rare.

In the field I took it to be *C. humilis Elm.* of middle northern Luzon, but upon closer examination I find it to be a much finer plant and sufficiently distinct in leaf characters. "Dulagmog."

Cyrtandra pallida Elm. n. sp.

Lax undershrub, 1.5 to 3 m. high; wood sappy, breaking with a snap; bark smooth, yellowish, ultimately finely checked longitudinally; twigs slender, half drooping, the younger tips densely fuliginous hairy. Leaves oppositely scattered along the branchlets, very unequal in size, lanceolate or more commonly oblanceolate, soft membranous, flat, much

lighter or paler green beneath, the larger blades 15 cm. long and 4 cm. wide across the middle, glabrous on the upper surface, frequently subfalcate and somewhat inequilateral especially toward the base, gradually tapering to the acute or acuminate point, base slenderly cuneate, margins subentire or occasionally denticulate toward the apex; petiole barely longer than 1 cm., in the younger state densely fuliginous pubescent; nerves very prominent beneath, ascendingly curved, faintly united along the margin where the hairs extend beyond the margin as a ciliate fringe, 5 to 7 main pairs, occasionally with secondary ones between, reticulations coarse and quite prominent beneath, all densely fuliginous pubescent. Flowers solitary or 2 to 3-clustered, axillary, subtended at the base by a whorl of 2 to 3 pubescent short bracts; pedicels strict, 1 cm. long, fuliginous pubescent even in the fruiting state, ebracteolate; calyx 6 mm. long, bristly pubescent on the exterior; the 5 segments united at the middle, lanceolate, the margins above the middle involute and tapering to a setaceous point; corolla less than 1.5 cm. long, the basal portion tubular, saccate or inflated from below the middle, delicate, whitish, glabrous, the broad lobes 4 mm. long, rounded, nearly equal in size and rotately spreading; stamens 4, glabrous, inserted at the middle of the corolla, 2 fertile and 2 sterile; the fertile filaments thick and very strongly looped; the sterile ones straight and filiform; anthers broad and elliptic, nearly 1 mm. in length; ovary 4 mm. long, glabrous, conically elongated, surrounded at the base by a thick rim like disk; style persistent, as long as the ovary, comparatively thick, glandularly hairy; stigma 1 mm. high, nearly twice as broad, capitate, pulverulent; berry pallid, more or less pendulous, not juicy, rather hard, smooth and glossy in the fresh state, rugose when dry, ellipsoid, 5 mm. long, 4 mm. in diameter; seeds very numerous, light brown.

Type specimen 9518, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

A rather common undershrub in humid woods from 3000 to 4500 feet. The glossy pallid fruits were plentiful during my entire stay of four months, but the flowers were just appearing at the close of the collecting season or toward the end of June.

The absence of peduncles and the conspicuous involucral bracts distinguish it at once from *Kraenzlins' C. benguetiana* and *C. micrantha*. "Halau-hauy".

Cyrtandra antoniana Elm. n. sp.

A suberect and reclining shrub, 3 m. high; branches rather long, sparsely branched, rigid, heavy, watery, crooked, the tips suberect; wood soft, yellowish, with a large pith; bark yellowish gray, that on the old stems becoming thinly checked, the young portion covered with dry subglistening dull olivaceous hairs or scales. Leaves only toward the ends, opposite, 1 to 2 cm. apart, usually only 3 pairs to a twig, flat, radially spreading, quite variable in size, heavy, succulent but rather stiff, the upper dark green surface minutely papillose under a lens and sparsely provided with yellowish gray soft crinkled hairs, somewhat yellowish green beneath, the larger blades in the dry state 15 cm. long, 7 cm. wide across the middle, broadly oblong, apex abruptly acute or obtuse, base attenuate or slenderly cuneate, frequently inequilateral especially toward the base, the basal one half entire, otherwise denticulate, beneath olivaceous in the dry state; nerves conspicuous beneath, densely covered with dry scale like olivaceously colored hairs, 7 to 9 pairs, all ascendingly curved, the ends far extending along the margins and ultimately becoming united, the coarse reticulations and secondary nerves quite in evidence; petiole varying from 1 to 3 cm. long, stout, covered with soft olivaceous crinkled trichomes. Inflorescence pendulous from the leaf axils, 1 to 3-flowered; peduncle green, pubescent, strict, about 2 cm. long, occasionally subtended by a solitary foliaceous bract, pedicels only sparsely strigose, slender, 1 cm. long, purplish; the subtending pair of foliaceous bracts 1.5 cm. long, broadly lanceolate, thin, sparsely strigose, pale green, occasionally the larger ones toothed at the apex; calyx more rigid than the bracts, green, campanulate, 2 cm. long, 1.5 cm. wide toward the top, subglabrous or strigose at the base; the 5 acute segments cut to the middle or slightly beyond the middle, finely punctate; corolla bud rounded and of a deeper purple than in full anthesis; corolla purple, early falling, 3 cm. long, gradually tapering from the base to the 1.5 cm. wide

upper portion, glabrous; the 4 lobes 8 mm. long, very broad and rounded, rotately spreading and 2 to 3 cm. across, barely exceeding the tips of the straight calyx segments, punctate glandular on the upper surface; stamens 4, inserted upon the middle of the corolla tube, 2 fertile and 2 sterile; filaments purplish, of the fertile ones glabrous, very thick, 1 cm. long including the double loop, barely exceeding the throat; the sterile ones straight or curved, much thinner and only 2 mm. long, subclavate; anthers 4 mm. long, 2 mm. thick, dorsifixed; pistil straight, 2 cm. long, glabrous; ovary surrounded at the base by a shallow cupular rim, oblong; style purple, nearly 2 mm. thick, 1 cm. long; stigma an obscurely bilobed greenish flattened disk, nearly 4 mm. in diameter; fruits shining pale purple, fusiform from the base, 2 to 3 cm. long or longer, terminated by the persistent style, terete; seeds numerous, imbedded in the fleshy pulp, brown, ellipsoid with short fusiform points, 0.3 to 0.5 mm. long.

Type specimen 9542, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

This most characteristic species is very rare, and inhabits the wet scale mossy region of the summit at 6000 feet elevation. Its branches are well interlaced with other rigid shrubs. The large coriaceous, hairy leaves and the showy pendulous flowers presents a very marked contrast to the usually small, rigid and glabrous foliage associated with small inconspicuous flowers of most all the other plants in this region. Called by one of the native hunters "Handulumog." Named after our little son *Anton*.

DICHROTRICHUM Reinw.

Dichrotrichum chorisepalum Clarke in *DC.* Monog. Phan. 5; 53, 1883.

A climber, stems green, pliable, branched and rather lightly attached to its support, not twining, branched and interlaced at the top. Leaves coriaceous, descending, dark green above, paler beneath. The green peduncles are at right angles to the stem; flowers odorless, spreading, recurved, deep purple

throughout, subtended by foliaceous bracts, pedicels and calyx very dark or dull brown, only the segments of the latter green.

Specimen 10074, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

Upon small tree trunks of the humid woods from 2250 to 3500 feet. The pretty flowers present a pleasing contrast to the dark green foliage.

EPITHEMA Blm.

Epithema benthami Clarke in *DC.* Monog. Phan. 5; 180, 1883.

Stems green, succulent. Leaves submembranous, exceedingly variable in size, deep green above, much paler beneath, flat. Peduncle erect, bearing a terminal green circinately disposed or subsecund cluster of flowers; bracts and calyx green; flowers deciduous, azure blue especially toward the apex; stamens yellowish white; pistil greenish.

Specimen 9698, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

This pretty herb adorns moss covered rocks and boulders lying in gulches of damp well shaded hemp fields along the Bonyao river at 2500 feet. The plants vary greatly in size. "Hansau."

ISANTHERA Nees.

Isanthera discolor Maxim. in Bull. Acad. Petersb. 19: 538, 1874.

Rather erect, usually several stems from the same root cluster, stems herbaceous or suffrutescent especially toward the base, covered with a thin yellowish brown bark or epidermis. Leaves limp, much paler beneath; corolla delicate, white, subpendulous, deciduous; berries subpersistent, soft, white, watery; seeds numerous, minute, brown.

Specimen 10436, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

A common plant of the "Abaca" fields especially on the slopes of very steep and damp ravires from 1500 to

3000 feet. The Filipinos call it "Handulumog", and they occasionally boil the leaves and apply them to wounds.

RHYNCHOGLOSSUM Blm.

Rhynchoglossum obliquum Blm. Bijd. 641, 1825.

Flaccid and succulent herbs, varying much in height; stems soft, watery, green, smooth and easily breaking. Leaves rather thin, paler green beneath, flaccid, the prominent nerves beneath succulent and green. Flowers divaricate, pale blue; rachis, pedicels and bracts green.

Specimen 9664, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

This species grows in sandy earth of shady ravines along the Banyao river at 2500 feet, or in talus beds near cliffs. "Handulumog".

Rhynchoglossum spumosum Elm. n. sp.

Flaccid herbs, no more than 10 cm. high; watery stems smooth, green, recliningly spreading or decumbent, sparsely branched. Leaves descending or horizontally spreading. wrinkled, deep velvety green above, flaccid, characteristically dull indigo blue beneath, strongly nerved on both sides, alternate, diverse in size, subfalcate, oblique and inequilateral, the larger blades 5 cm. long and one half as wide across the middle, ovate to oblong, entire, flat, abruptly acute at the apex, subtruncate at the base; petiole glabrous, 1 cm. long; nerves 9 to 11 pairs, oblique, more conspicuous and pulverlent beneath. Inflorescence suberect, terminating the stems and branches, green and glabrous except the corolla, bearing 2 to 5 pedicellate flowers; pedicels slender, 5 mm. long, divaricate, subtended by laciniate 3 mm. long bracts; calyx greenish, somewhat inflated and angular, 7 mm. long, glabrous, divided into 5 acuminate segments; corolla 10 mm. long, delicate, descending, caducous, odorless, whitish toward the base, azure blue toward the apex, tubular, bilipped; the upper lip very short, reflexed, bidentate, the teeth again notched; the lower lip very broad, nearly straight, obscurely 3-lobed, the

lateral pair very small; the terminal one broad and obtuse or acute, with an orange red blotch between its base and the top of the lateral membranous folds; stamens 2, equalling the throat; filaments flattened, inserted on the upper side of the tube below the middle, usually curved; anthers divaricate, opening along the edge, 0.75 mm. high, 1.25 mm. wide; style 6 mm. long, glabrous, terete, curved oppositely to the filaments; stigma capitate, finely woolly; ovary oblongish conical, glabrous; fruits 5 mm. long, elongated ellipsoid, 2.5 mm. in diameter, glabrous; seeds very numerous, brown, ellipsoid or at the base subtruncate and ending in a very short stipitate base, 0.25 mm. long, imbedded along the centrally woolly placentæ.

Type specimen 9929, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

On seepage cliffs and especially along the spray of a waterfall of the Bonyao river at 3000 feet. It forms dense mats, the flowers are rather conspicuous for the size of the the plants, the foliage has a pretty rich steel blue or dull purplish underside while the upper surface presents a velvety green appearance when fresh and in the wet state.

TRICHOSPORUM Don.

Trichosporum crassifolium Elm. Leaf. Philip. Bot. 1; 343, 1908.

Epiphyte upon tree trunks of ravines at 2750 feet. Flowers odorless, in pairs or in small clusters from the fallen leaf axils or from the axils of the leaves, chiefly from the drooping branches; pedicels and bracts green, rather soft and pliable; corolla also soft in texture, usually somewhat recurved and flattened toward the apex which is dark purple red, the basal portion inflated and light rather shiny green; filaments whitish; anthers dark brown; pistil greenish; stigma more whitish than the filaments; the old persistent carpels 1.5 dm. long.

Specimen 10262, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

A well characterized species in the field as well as in the herbarium. In our locality it grows upon tree trunks of ravines at 2750 feet.

Trichosporum cuernosense Elm. n. sp.

Subscandent; stems and branches wiry, smooth, terete, yellowish gray or the younger parts green. Leaves heavy, rigid, slightly descending, edges comparatively sharp, glabrous, deep green on the upper side, yellowish so beneath, ovately lanceolate or narrowly oblong, 5 cm. long by 2 cm. wide just below the middle; nerves much ascending, quite conspicuous on the under side at least in the dry state, 3 to 5 pairs; petiole at least 5 mm. in length, glabrous, much wrinkled in the dry state. Inflorescence a few flowered cluster, either subsessile or upon elongated stalks, terminal or lateral and from the leaf axils; peduncle stout, terete, at first provided with yellowish strigose hairs, the primary one less than 1 cm. long, terminated by 2 to 3 acute bracts; secondary peduncle, occasionally present and slenderer; pedicels slender, glabrous, 1 cm. long, more or less thickened at both ends, especially at the distal end; calyx red, 6 mm. long, 4 mm. thick, cylindric, easily separating from the base, terminated by 5 shallowly rounded lobes; corolla cardinal red, yellowish red within, 3.5 cm. long, tubular below the middle, curved and somewhat inflated above this, 8 mm. thick toward the apex, mostly glabrous but occasionally strigose; segments mostly 4, rotately spreading or deflexed, the upper one deeply bilobed, 7 mm. long, all broadly rounded and sparsely ciliate; stamens didymous, slightly protruded; filaments strongly curved upward, glabrous, inserted upon the inside of the corolla tube above the middle; anthers oblong, 2 mm. long, truncate at both ends, dorsally affixed; strap like ovary upon a slender glabrous stalk arising from the center of the large circular disk; style 3 mm. long, short yellowish pubescent; stigma a large circular disk, pubescent on the outer side, glabrous on the upper stigmatic surface; fruit not seen.

Type specimen 9522, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

In dense shrubby jungles on steep north slopes of ravines at 2750 feet.

The dry nerved leaves approach *T. nervosum Elm.* from middle northern Luzon, but it has entirely different calyces. From *T. negrosense Merr.* it is distinguished by its nervose differently shaped leaves and tubular or cylindric calyx.

Trichosporum truncatum Elm. n. sp.

Scandent and slenderly branched; stems and branches smooth, green, glabrous. Leaves rigid, the tips only slightly recurved, opposite, easily detached, quite variable in size, ovate to oblongish, the apex short obtuse, base rounded or shallowly cordate, the larger ones 8 cm. long by 4 cm. wide, entire margins edge like, deeper green above; midnerve very prominent beneath, caniculate on the upper side, the lateral ascending pairs very obscure; petiole 4 to 7 mm. long, glabrous, thick, strongly wrinkled in the dry state, channelled along the upper side. Flowers severally clustered, terminal or subterminal and from the uppermost leaf axils; pedicels 5 to 8 mm. long, thick, terete, usually becoming glabrous and recurved, persistent, at the base subtended by vestiges of ciliated bracteoles, much thickened at the distal end; calyx coriaceous, shining deep purple red toward the apex, 3 cm. long, nearly 1 cm. thick, tubular or occasionally subcampanulate toward the top, truncate and easily becoming detached at the base, glabrous, the 5 broad segments rounded and 5 mm. in length; corolla lighter red or purple, 5 cm. long, slightly curved, also glabrous, 1 cm. thick toward the throat; its segments rotately spreading, about 7 mm. long, the uppermost bilobed and finely fringed with glandular hairs, all strongly streaked on the inner side toward the base; filaments glabrous, in 2 pairs, attached to the inside of the corolla tube above the middle, strongly curved upwards; anthers protruded, oblong, 3 mm. long, dorsally attached, bifid at the base, truncate at the apex; pistil as long as the corolla, only slightly curved; ovary linear, upon a slender flattened stalk, glabrous, gradually tapering into the 7 mm. long glandular pubescent style; stigma large, disk like, glandular hairy on the outer surface, hairless on the stigmatic side; fruits not seen.

Type specimen 9426, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

In dense shrubberies of steep northern slopes of deep ravines at 2750 feet.

It approaches *T. clementis Merr.* which has short broadly ovate leaves and calyx more rounded and inflated.

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LEAFLETS OF PHILIPPINE BOTANY

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NEW PHILIPPINE ZINGIBERACEAE

BY

HENRY N. RIDLEY.

(*Dir. Botanic Gardens, Singapore, Straits Settlements.*)

—o—

Elmeria Ridl n. gen.

Herbs with few or solitary stems of moderate height. Leaves lanceolate or elliptic. Inflorescence a terminal capitulum. Bracts large, ovate, persistent. Bracteole utricular with 3 acute lobes, ciliate at the tip, the nerves or bracts and bracteoles anastomosing. Calyx tubular, trifid. Corolla tube longer, fleshy, lobes thin, rounded. Lip fleshy, adnate to the stamen near the anther, quite entire or bifid, short. Staminodes none. Stamen filament broad, linear. Anther cells linear, pubescent, crests small or none. Style short, slender, filiform. Capsule subglobose, terminated by the calyx tube, few seeded.

Philippines, endemic.

Lip bifid.

1. *E. bifida.*

Lip entire.

2. *E. pinetorum.*

1. **Elmeria bifida Ridl.** n. sp. *Hornstedtia paradoxa Ridl.* in Govt. Lab. Publ. 35; 85, 1905.

Stems solitary, erect or drooping, 1 to 3 m. tall, slender. Leaves lanceolate, acuminate, caudate, glabrous, 30-45 cm. long, 2-7 cm. wide and narrowed at the base to a short petiole. Ligule oblong, truncate, bilobed, glabrous or nearly so, margins of sheath pubescent. Capitulum ovoid, rounded, nodding, 7 cm. long, yellowish red. Outer bracts ovate, rounded, margins sparingly ciliate, nerves elevated, anastomosing. Bracteole utricular, enclosing 2 flowers, tip 3-pointed and ciliate. Calyx tubular, 3-lobed, lobes acute and ciliate at the tip. Corolla fleshy, tube moderately long, lobes oblong, upper one oblong ovate. Lip adnate at the base of the corolla tube. Stamen thick, fleshy, deeply bilobed into 2 linear encurved lobes, convolute when dry. Stamen filament broad. Anther cells linear, pubescent. Appendage small, ovate. Capsule subglobose, glabrous, with few seeds.

Luzon, Tayabas province, mount Banahao, (*Elmer* 7396); Lucban (*Elmer*, 7706).

2. **Elmeria pinetorum Ridl.** n. sp.

Plant 2 m. tall, all the stems much reclining or recurved. Leaves elliptic or elliptic-lanceolate, acuminate, glabrous except on the midrib beneath pubescent and above shortly hairy, margins ciliate hairy, 15 cm. long, 4 cm. wide, base subcuneate, dark green, petiole very short. Ligule 2 mm. thick, white ciliate, sheath 7 cm. long, edged with stiff white hairs. Capitulum terminal, nodding, globose, 6 cm. long, outer bracts ovate rounded at the tip, finely striate, glabrous except the white ciliate edge, dull red. Bracteole utricular, with 3 acute lobes, white hairy at the tip, enclosing 2 flowers. Calyx tubular, a little longer, with 3 acute points with tufts of hair at the tip. Corolla tube cylindric, glabrous, 2 cm. long, dilated above, lobes short, oblong, yellow. Lip fleshy, entire, base saccate, oblong, limb triangular acute. Stamen shorter. Anther broad, apex deeply excavated. Style slender, shorter. Stigma small, red.

Luzon, Benguet province, Baguio, (*Elmer* 8548).

Small tufts in limestone rocks of the pine region at 5000 feet, rare. Native name "Barapat".

Phrynium philippinense Ridl. n. sp.

Whole plant about 1 m. tall. Rhizome thick, with

stout roots emitting many fibrils. Base of sheaths silky. Leaf stalk to the flower head 1.6 m., stout, hairy above. Lamina 30-40 cm. by 15 wide, glabrous, oblong elliptic. Inflorescence 20 cm. long. Capitulum large, 3 cm. through in flower, 5 cm. in fruit. Bracts oblong, ribbed, soon breaking into fibrils at the top. Bracteoles similar. Flowers in pairs, white and pink, shortly 1 mm. stalked. Ovary silky. Sepals linear, acute, closely ribbed, hairy only at the tip, longer than the corolla tube, 1-2.5 cm. Corolla tube dilated upwards. Lobes obovate, spatulate, hairy at the tip. Staminodes thin, rounded, obtuse. Cucullus small, side lobe linear-oblong. Stamen anther very short. Connective wing large, subtriangular. Lip small, oblong, truncate, almost quadrate, crest large, semiovate, longitudinal ridge silky. Capsule oblong, red, 1 cm. long, hairy. Seed nearly 1 cm. long, obscurely rugose, tubercled.

Leyte at Palo, (*Elmer* 7289).

This species is most nearly allied to the Malay peninsula *P. malaccense Ridl.*, differing in its more glabrous leaves, nearly glabrous sepals and form of the lip. It has been confused with *P. capitatum Willd.* a Chittagong plant with purple sessile flowers.

Alpinia penduliflora Ridl. n. sp.

A tufted plant, 3-4 m. tall. Leaves elliptic-lanceolate, acute, acuminate, base rounded, glabrous, 35 cm. long, 16 cm. wide, midrib stout, petiole very short. Ligule as long, truncate, entire. Sheath broad, glabrous. Inflorescence 4-5 dm. to 1 m. long, terminal, pendulous, peduncle short, rachis stout. Branches very numerous, puberulous, short, 2 cm. long, clustered, with short lateral erect branchlets. Bracts small, ovate, puberulous. Calyx tubular, 1.5 cm. long, trifid with 3 pubescent subacute lanceolate leaves. Corolla tube barely as long. Lobes white, crisped and rounded, upper one linear-oblong, obtuse, lateral broadly obcuneate bilobed lobes. Stamen filaments rather short and thick, cells large. Capsule globose, 1.5 cm. long, glabrous, ribbed, many seeded.

Leyte at Palo, (*Elmer* 7288). Endemic.

Perhaps most nearly allied to *A. Galanga Willd.* An allied

plant with similar foliage and fruit but with a very dense raceme, with shorter very crowded branches silky, was collected on mount Santo Tomas, Benguet province, Luzon, by *P. T. Barnes* of the Forestry Bureau (number 947) but there are no flowers on the specimen.

Plagiostachys philippinensis Ridl. n. sp.

Stems 1-2 m. tall. Leaves lanceolate acuminate, narrowed at the base, 20 cm. long, 8 cm. wide, glabrous above, more or less pubescent beneath. Ligule truncate, sheath bearing, petiole winged in adult. Inflorescence lateral near the base, cone-shaped, 6 cm. long, simple or 3-branched, branches 4-6 cm., peduncle stout, covered with ovate sheaths, rachis and bracts felted pubescent. Bracts lanceolate acuminate, woolly. Flowers pale red. Calyx tubular, bilobed at the tip, woolly, 1 cm. Corolla tube little longer, lobes linear oblong, hooded, all hairy, white with red streaks. Lip obovate, glabrous, with a narrow bifid terminal portion, central bar of lip elevated, fleshy and warty, ending in 2 short warty elevated arms at the base of the terminal tube. Staminodes flat, spatulate, as long as the short filament. Anther thick, crest rounded, distinct, ovary silky. Capsule obconic, tip broad, rounded, 1 cm.

Luzon, Tayabas province, Lucban (*Elmer* 7915).

In dry soil of the woods.

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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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A SCORE OF NEW PLANTS

BY

A. D. E. ELMER.

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CYPERACEÆ.

MAPANIA Aubl.

Mapania lucbanensis Elm. n. sp.

Tufts from short, thick suberect stems; roots wiry, terete, blackish. Leaves ample, slender, the upper portion reclining, glabrous, striate especially on the lower side below the middle, the ridges 3 to 5 on each side of the midrib and rather close to it, flat, the basal portion strongly conduplicate on the upper side of the leaf, somewhat paler green beneath, the margins and midrib toward the apex serrate, slenderly tapering to the acuminate point, nearly 2 cm. wide, 8 dm. long; stipular sheath thin, dry, brown, 5 mm. wide, 1 dm. long. Scape arising from the leaf base, not much longer than one half that of the leaves, ascending or suberect, reddish brown at least in the dry state, 2 to 3-jointed, provided with overlapping sheaths especially toward the base; sheaths similarly colored, smaller and more numerous toward the base, acute to acuminate, ample, open and split from the apex

down to the middle, otherwise united; inflorescence corymbose, 3 cm. high, 5 cm. across; peduncles reddish brown, subtended by rather acuminate bracts, subcompressed, the lower ones divaricate, the upper ones suberect, strict, at the distal end bearing several spikes; secondary peduncles 2 to 5 mm. long, stout, subtended by comparatively short bracts; heads 7 mm. long by 3 mm. wide, ellipsoid; bract subtending the spikelets 2.5 mm. long, 2 mm. wide, entire, elliptic or more obovate but from a broad base, glabrous, only the midrib somewhat keeled on the back; lateral 2 glumes strongly keeled, 2 mm. long, subfalcate, its sides hyaline, 0.75 mm. wide when spread out and obtuse or subtruncate at the apex, the prominent ridge along the back spinulose, each enclosing a single staminode; palea usually 3, membranous, unequal in length and size, glabrous, equaling the outer segments, the apex oblique to subtruncate and becoming fimbriate; pistil strict, 2.5 mm. long, also glabrous, terminated by 2 dark brown colored 1 mm. long stigmatic arms; seeds nearly 2 mm. long by 1 mm. thick across the middle, about 6-angled, constricted toward the base, bulging around the middle, the apex abruptly terminating into the subpersistent style.

Type specimen 9116, *A. D. E. Elmer*, Lucban, Province of Tayabas, May, 1907.

Mapania banahaensis Elm. n. sp.

Leaves at least 2 cm. wide, 2 to 3 m. long, the apical 3 dm. slenderly tapering into a slender fine tail, edges entire except the fine serratures toward the apex, smooth and shining, paler green beneath, the sides mostly with one corrugation, faintly striate beneath; the midrib keeled beneath, scabrid especially toward the apex. Scape at the apex nearly 5 mm. thick, smooth, with only a few minute spinescent blackish hairs; spike cluster 2 to 3 cm. across, subtended by unequal 1 to 2 cm. long bracts; spike 1 cm. long, upon short peduncles, subtended by bracts; fruits 4 mm. long, 3 mm. thick across the middle, usually bearing the persistent style, subellipsoid, apex and bulge rounded, base more tapering, mostly maturing around the base of the spike; the glumes, pelea and subtending bracts of the spikelets marscescent.

Type specimen 7639, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

In the woods of mount Banahao from 1750 to 2500 feet. Several other sterile species were observed in this same place.

An ally of *M. palustris Benth.*, but scapes not glandular scabrous; spikes fewer, making a smaller head; and narrower more slenderly tapering leaves.

ULMACEÆ.

APHANANTHE Planch.

Aphananthe negrosensis Elm. n. sp.

Tree, 8 m. high, with branches divaricately spreading above the middle; wood hard and heavy, concentric rings conspicuous, the sapwood white, the heartwood brown and much harder and tasteless; bark smoothish and mottled, the inner portion turning yellowish after being exposed; the twigs lax and slender, even the younger portions glabrous. Leaves alternate, chartaceous, descending, lucid dark green above, yellowish green beneath, curvingly conduplicate on the upper side, broadly lanceolate or subelliptic, entire, glabrous, apex slenderly acuminate, base obtuse and somewhat inequilaterally sided, greatly varying in size, the average ones 1 dm. long by 3.5 cm. wide across the middle; petiole 1 cm. long, glabrous; midnerve prominent beneath, reddish; lateral nerves straw colored in the dry state, 13 or more primary pairs, pinnate, alternating with reticulate secondary ones, obscurely united at the ends, not prominent. Male inflorescence upon short flattened spikes, 1 to 2 cm. long, solitary or several clustered, from the leaf axils or in the axils of fallen leaves, ascendingly spreading; buds reddish; flowers sessilly arranged in subdistichous rows along the upper side of the flattened rachis; calyx subglabrous, united at the base, in the bud state arching over the center, adnate, the 4 segments spreading in anthesis, 2.5 mm. long, acute; stamens 4, opposite the sepals, in the bud state strongly inflexed, cream color; filaments glabrous, flattened, gradually tapering from the base; anther basifixed, glabrous, 1 mm. long, 1.5 mm. wide, notched at the apex, cordate at the base, much compressed, laterally dehiscing, its

walls purplish spotted, style of the young fruits flattened and united at the base; stigmatic arms 3 mm. long, brown pulverulent along the inner sides; ripe drupes subglobose, juicy wine red, sour, mainly 1-seeded, about 5 mm. thick; seed ovoid, smooth, brown, 4 mm. long, on the ventral side subplano and at the apex bearing a whitish triangularly pointed cap.

Type specimen 9801 for flower and 10156 for fruit, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April and May respectively, 1908.

Our species inhabits the woods from 3000 to 4000 feet, and the natives call it "Calau." Its wood is extremely hard and heavy and it is said to be very durable. The ripe fruit is sour and is good to eat.

A closely allied species to *Gironniera glabra Merr.*, but leaves larger and less numerous, and apparently with larger pistillate flowers.

MYRISTICACEÆ.

GYMNACRANTHERA Warb.

Gymnacranthera negrosensis Elm. n. sp.

A 10 m. high tree; stem 4.5 dm. thick; crown elongated and bushy; wood odorless, whitish except for the yellowish red streaked vessels; bark reddish beneath the comparatively smooth and brown epidermis; branches lax and tangled; the twigs smooth, green, drying brown. Leaves coriaceous, dark shiny green above, much paler beneath, conduplicate on the upper surface, exceedingly variable in size, lanceolate, alternate, the larger blades 15 cm. long by 5 cm. wide across the middle, entire, scattered along the slender branchlets, gradually tapering to the rather blunt apex, base acute or obtuse; petiole 2 to 3 cm. long, glabrous, narrowly grooved along the upper side; main nerve prominent beneath, the lateral 9 to 13 pairs quite obscure, reticulations evident. Flowers solitary or in small clusters, in the leaf axils, or arranged upon short leafless branchlets; pedicels thick, flattened, 3 mm. long, covered with a fuzzy yellowish brown pubescence, subtended by vestiges of bracts, at the apex bearing a solitary or a pair of large thick similarly pubescent bracts; perianth yellow, 6 mm. long, the

upper one half much constricted and divided into 4 acute or acuminate segments, below the middle bulging; ovary included, light brown puberulent, elongate ovoid, 2 mm. long, 1.5 mm. in diameter at the base; style short, bearing an oblique callous dark brown stigma; nut yellowish, 5 cm. long, oblong in outline, similarly rounded at both ends; exocarp thick; the seed brown and covered with a meshed cartilaginous dark red arile.

Type specimen 10133, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

A fine appearing tree with numerous branchlets, rigid yellowish odorless flowers, and large nutmeg like fruits. Only one tree was found on a very steep wooded slope near the Bonyao river cataract at 2500 feet.

Allied to *G. paniculata* (*DC.*) *Warb.*

CUNONIACEÆ.

WEINMANNIA Linn.

Weinmannia negrosensis Elm. n. sp.

Tree like shrub, 3 to 5 m. high; branches rigid, erect; wood moderately hard, odorless, sappy red; bark smoothish, gray, only thinly checked. Leaves ascending, subcoriaceous, very smooth on both sides, glabrous, conduplicate on the upper side, dark green above, yellowish green beneath, always trifoliate, opposite, mostly scattered along the young glabrous twigs; petiole greatly varying in length, averaging 2 cm. long; petiole of the terminal leaflet about the same length, that of the lateral leaflets shorter, all glabrous; leaflets quite variable in size, oblongish to subelliptic, the normal ones 9 cm. long and 4.5 cm. wide across the middle, the lower pair smaller, apex acute, base abruptly attenuate and on the lateral leaflets inequilateral; margins crenately serrate, slightly involute; midnerve prominent beneath, the 7 to 9 lateral pairs ascending, the reticulations comparatively conspicuous; stipules glabrous, foliaceous, rotund, 1 cm. long. Inflorescence terminal or from the uppermost leaf axils, erect, 7 to 11 cm. long, mostly glabrous, the peduncle and portion of the rachis reddish; flowers scattered in subverticellate clusters; pedicels 1.5 mm. long, glabrous; calyx glabrous,

the 4 segments nearly free, rather thick, triangularly obtuse, 0.75 mm. long, 0.5 mm. wide at the base; corolla segments 4, alternating with the sepals, white and with a tinge of red, oblong, 1.5 mm. long, 0.75 mm. wide, slightly clawed at the base; stamens 8, spreading; filaments filiform, glabrous, 3 mm. long, arising from between stipular glands, reddish toward the base; ovary densely hairy, less than 1 mm. long; styles 2, short, glabrous, tapering into the brown stigmas; fruits not seen.

Type specimen 9656, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

A large rigid shrub or more often tree like in stature, in dense well interlaced jungles of shrubberies on a wind swept ridge at 4250 feet. Rare and only observed in one place. Flowers distinctly fragrant. The Visayan name is "Tangolamos-itum."

Approaches *Vidal's W. luzonensis*, but leaves always trifoliate and entirely glabrous; filaments much larger.

ROSACEÆ.

PARINARIUM Juss.

Parinarium coccineum Elm. n. sp.

Tall tree, 25 m. high or higher; stems 7.5 dm. thick; branches scattered above the middle, divaricate, comparatively short, crookedly rebranched; wood reddish white, quite hard and burly; bark thick, irregularly checked, reddish except the brown surface. Leaves alternate, leathery, dull green above, paler beneath, conduplicate on the upper side, glabrous except for the very minute hairs along the nerves and reticulations beneath, elliptic or ovately elliptic, entire, apex obtuse, base broadly obtusely rounded or subtruncate, and provided with a pair of glands beneath, margins subinvolute, 14 cm. long, 8 cm. wide; nerves conspicuous beneath, 7 to 9 pairs, oblique, tips archingly connected, reticulations numerous and very evident; petiole 1.5 cm. long, glabrous, caniculate along the upper side, frequently glaucous. Infrutescence axillary, spicate, from 5 mm. to 5 cm. long; the stalk stout, rigid, glabrous but with evidences of a yellowish brown pubescence; fruits sessile or upon very

short and pubescent pedicels, less than 1.5 cm. long, hard, smooth, except for the small lenticels, ellipsoid, crimson red; calyx persistent, rim like, 4 mm. across; seed solitary, in the center of the thick white pericarp.

Type specimen 9787, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

Discovered in a deep wooded ravine at 2000 feet. The natives call it "Guisok-na-dako".

Possibly it should be referred to *Pygeum*, but the shape of the fruit and especially the thick and dry pericarp place it with *Parinarium*.

SABIACEÆ.

SABIA Coleb.

Sabia reticulata Elm. n. sp.

Scandent and numerously branched; stems smooth and brown, 1.5 cm. long, tough; twigs slender and glabrous. Foliage nearly flat, descending, with recurved tips, dry and subscarious, very lucid deep green on the upper side, much paler beneath and blackish especially along the nerves and reticulations, lanceolate or oblongish lanceolate, alternate, exceedingly variable in size, much reduced toward the ends of the twigs, glabrous, the average blades 10 cm. long, 3.5 cm. wide, base short obtuse or rounded, apex acute to subacuminate, the entire margins usually rugose; nerves very prominent beneath, the 3 to 5 main lateral pairs united one third from the margin, reticulations numerous and conspicuous; petiole 1 cm. long, glabrous, grooved on the upper side, smooth at first, becoming scurfy with age. Racemes ascending from the leaf axils, yellowish green, glabrous, varying from 3 to 13 cm. in length, usually more numerous toward the ends of the twigs; peduncle strict, ascending, less than 1 cm. long, at the base provided with a callous excrescence, bearing 1 to 3 greenish white and odorless flowers; pedicels glabrous, about 5 mm. long, strict, provided with a solitary bract; bract oblong, elliptic, 2 mm. long, glabrous but with ciliate margins; calyx turbinate, 1.5 mm. long, glabrous; its 5

segments broadly obtuse; corolla imbricate, opposite the calyx segments; segments 5, about 4 mm. long, nearly 2 mm. wide, oblong, concave on the upper side with inrolled tips, parallel nerved; stamens 5, flattened, glabrous, erect and strict, 2 mm. in length; anthers terminally attached to the blunt filaments, 0.3 mm. long, the valves widely separating after pollination, broadly ellipsoid; ovary superior, glabrous, 2-celled, 2-ovulate, each cell conically tapering into 2 nearly free short styles bearing small terminal stigmas; fruit subellipsoid, less than 1 cm. thick, soft and deep azure blue when mature, the seed somewhat flattened.

Type specimen 10027, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

Collected in dense shrubberies on a very steep slope at 3000 feet. The ultimate branches are occasionally very long and widely spread over thickets.

Very near *S. philippinensis C. B. Rob.*, the only other Philippine species, but with larger more reticulate leaves which are constantly blackish beneath, not green; inflorescence racemose, not cymose; and fruit differently shaped. Compare with my number 5866 from Baguio collected a few years ago, and which is identical with *Robinson's* species.

DILLENIACEÆ.

SAURAUIA Willd.

Saurauia panduriformis Elm. n. sp.

Shrub like tree, 4 m. high; wood coarsely grained, soft, reddish especially toward the center; bark rather thick, also reddish beneath the brown epidermis, longitudinally checked and scaling in plates; branches sparingly rebranched, easily breaking, young twigs rough with grayish scales. Leaves coriaceous, chiefly terminal and ascending from the suberect ends of the twigs, flat, dark green on the upper side, much paler beneath, variable in size at least, the larger ones 2 dm. long by 1 dm. wide above the middle, pandurately obovate, the lower surface sprinkled with minute ashy gray scales especially along the nerves, apex rounded or flatly

obtuse, base rounded; margins toward the base entire, crenately toothed or serrate above the middle; nerves 11 to 13 pairs, ascending and quite parallel, anastomosing, prominent beneath, cross bars comparatively faint, reticulations obscure; petiole 1 to nearly 2 cm. long, densely gray scurfy. Inflorescence always clustered along the twigs below the leaves, in small clusters arising from the leaf scars, not exceeding 3 cm. in length; peduncle strict, scurfy, usually cymosely branched above the middle; pedicels more scurfy, 1 cm. long, but frequently much shorter, subtended by very minute bracteoles, persistent; outer whorls of 3 sepals subglabrous, short, obtuse, unequal; the 3 inner ones subelliptic, 4 mm. long, glabrous; petals 5, white, obovate, 6 mm. long, 4 mm. wide above the middle, striate, united around the base, deciduous as a whole, apex broadly rounded and usually lobulate; filaments 1 mm. long, flattened, more or less united at the base; anthers 1.5 mm. long, bilobed at the base; ovary conical, glabrous; styles mostly 3, divided clear to the base, glabrous, 3 mm. long, each terminated by a small capitate stigma, the upper portion curved or wand like; fruits not seen.

Type specimen 9209, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

In light jungles or woods bordering grassy glens at 2250 feet of mount Banahao.

Not *S. whitfordii Merr.* which has more glabrous leaves; flowers subtended by foliaceous bracts; and calyx scurfy pubescent. Nearest to *S. sparsiflora Elm.*, but our specimen has larger and fewer leaves with apices rounded, not acute; there are also minor differences in the flowers.

MYRTACEÆ.

EUGENIA Linn.

Eugenia incrassata Elm. n. sp.

A widely spreading tree, 15 m. high; its main branches arising from below the middle, the ultimate ones rather numerous and forming bushes; wood whitish, quite hard; bark gray and brown mottled; twigs glabrous, tough. Leaves opposite, scattered along the branchlets, rigid, dark shiny green

and usually conduplicate on the upper side, much lighter beneath, ascending, the entire margins involute, glabrous, minutely punctate above, below usually provided with many brown to coal black circular dots, obovate, the apex broadly rounded to subtruncate and usually terminated by a distinct blunt point, base quite abruptly attenuate, the margins frequently decurrent along the stout glabrous 1 cm. long petiole, the average ones 8 cm. long including the petiole, 5 cm. wide above the middle; midvein prominent, grooved along the upper side, keeled or edged along the lower; lateral veins numerous, equally obscure on both sides, ascending and parallel, submarginally united. Inflorescence terminal or from the uppermost leaf axils, glabrous, corymbose, about 1 dm. across, slightly exceeding the leaves; peduncles ascending, branched above the middle; the secondary ones irregularly angular, articulate and in the early stage subtended by bracts; pedicels a few mm. long, subtended by a pair of thick triangularly obtuse 1 mm. long bracts; calyx reddish brown, 6 mm. long, 4 mm. wide across the top, turbinate, wrinkled in the dry state, subtended by a pair of small bracts, 4-apiculate; corolla creamy white, caducous, in the bud state imbricately overarching the sex organs, irregularly elliptic, 3 mm. across, with a few large punctate glands, about 4 and calyptrately falling; stamens numerous, in the bud state inflexed, ultimately widely spreading, inserted upon the ovary rim, unequal in length; filaments glabrous, fleshy, thickened and somewhat flattened toward the base, at first connivent, ultimately nearly free, with a strong persistent bond at the point of inflection, the longer ones 5 mm. in length; anthers basifixed, 0.75 mm. long, elliptic or widest at the subcordate base; style 3 to 4 mm. long, subterete, strict, glabrous, bearing a small terminal stigma; ovary sunken beneath the enlarged calyx rim; fruit not known.

Type specimen 9187, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

Discovered in open woods skirting mount Banahao and bordering grass fields at 2000 feet. Its flowers have a very strong clove odor and the calyces are very stringent with the same taste. Possibly they could be utilized in commerce. Aside from the mount Mariveles *E. congesta Merr.*, it is

the only Philippine species with truly obovate leaves. Apparently it falls in the same group with *E. sablanensis Elm.* and *E. marivelensis Merr.* and one or two other very closely allied undescribed forms or species.

Eugenia robinsoni Elm. n. sp.

Erect tree, with a 6 dm. thick, rather straight 12 m. long bole; branches chiefly toward the top, forming a dense elongated crown; twigs smooth, quite numerous. Leaves opposite, scattered, chartaceous, glabrous, shining deep green on the upper side, much paler beneath, the tips abruptly recurved, the lower side densely and minutely puncticulate, oblong to subelliptic, the apex abruptly terminating into a 1.5 cm. long caudate point, base mostly acute or obtuse, margins entire, the medium blades 7 cm. long by 3 cm. wide across the middle; petiole at least 1 cm. long, the upper portion gradually expanding into the blade proper, glabrous; midvein prominent, caniculate along the upper side; the lateral ones more evident on the lower side, subparallel, ascending, submarginally united. Inflorescence terminal and profuse, corymbosely paniculate, at least 5 cm. across, glabrous; the main and secondary peduncles ascending and branched above the middle; pedicels 1 to 3 mm. long, subtended by small deciduous very thick bracts, bearing 1 to 4 sessile and fragrant flowers; calyx turbinate, 4 mm. long, about as wide across the top, wrinkled in the dry state, glabrous and occasionally distinctly glaucous, terminated by a truncate rim, or in the bud state with 4 shallow broadly rounded teeth; corolla snow white, 4, rather thick, orbicular to broadly elliptic, falling off separately, 4 mm. across; stamens indefinite, at first inflexed, ultimately spreading and well interlaced; the filaments glabrous, inserted upon the calyx rim, unequal in length, the longer ones 5 mm. long; anthers broadly elliptic, 0.33 mm. long, basifixed and frequently subcordate at the base; style strict, also glabrous, 4 mm. long, bearing a small terminal stigma; ovary deeply imbedded in the calyx which terminates into a thick rim; fruit not known.

Type specimen 10050, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

Here and there isolated trees stand in humid woods at 4000 feet. So far only known from the island of Negros although a very closely allied species has been collected on Samar. Named after *Dr. C. B. Robinson* who kindly aided me in the determination of *Myrtaceæ.*

Eugenia vidaliana Elm. n. sp.

Slender erect tree, 15 m. high; branches many, the ultimate ones subpendulous; bark of the twigs brown, smooth. Leaves opposite, chartaceous, deep shining on the upper surface, paler beneath, when dry nearly black on the upper side and brown and sprinkled with minute black dots on the lower, oblong to obovate to oblanceolate or only the smaller ones lanceolate, the medium sized blades 14 cm. long, 5 cm. wide across the middle or just above this, the entire margins subinvolute, glabrous, abruptly acute at apex, base cuneate; petiole 1 cm. long, thick epecially at the base, also glabrous, caniculate on the upper side; midvein prominent beneath, grooved above; lateral nerves 6 to 9 on each side, brown, conspicuous beneath, much ascending, tips not united, reticulations very few and obscure. Infrutescence terminal, usually 2 or sometimes 3-branched from the base, 3 to 7 cm. long; few flowered toward the end of the peduncles; pedicels and peduncles glabrous, stout, the former about 1 cm. in length; fruits only 1 to 3 coming to maturity, 3 to 5 cm. long, about 3 cm. thick through the middle, the base prominently pointed and suboblique, smooth, terete, creamy white, the skin rather soft and dry, in the dry state densely spotted with flat circular dots, the apex bearing the calyx tube which terminates by 4 reflexed segments; seed or seeds ellipsoid, 2.5 cm. long, 2 cm. thick, transversely divided below the middle, horny, brown, the exterior rough and cinder like in appearance.

Type specimen 9161, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

It differs from *E. cinnamomea Vid.* in not having leaves "oblongo-lanceolata"; neither are the nerves united at their ends; and panicle not many flowered. Named in honor of *D. Sebastian Vidal y Soler.*

ARALIACEÆ.

SCHEFFLERA Forst.

Schefflera paniculata Elm. n. sp.

Scandent, its branches not numerous but widely scattering; stems 3 cm. thick, soft, pith large, strongly araliaceous in odor, covered with thin yellowish bark. Leaves alternatingly scattered toward the ends of the twigs; petiole 1 to 2 dm. long, strict, glabrous, subterete, at the base expanded into an interaxillary broadly obtuse stipule; petiolule 2 to 5 cm. long, much thinner, also glabrous; leaflets 6, digitate, ovate to elliptic or even oblongish, occasionally slightly inequilateral, apex abruptly acute, base broadly rounded or short obtuse, coriaceous, ascending, glabrous, deeper green and slightly conduplicate on the upper side, with tips recurved, entire, quite variable in size, the larger ones 10 cm. long by 6 cm. wide across the middle; nerves beside the midnerve obscure on both sides, ascending, 7 to 9 on each side, submarginally united, the coarse reticulations barely visible. Panicle always terminal, 2 to 3 dm. long, nearly as wide across the base, glabrous; main branches divaricately ascending, yellowish green, alternatingly scattered or occasionally subverticellately clustered, rebranched from about the middle; secondary branches comparatively short, strict, divaricate, more numerously clustered at the apex, not exceeding 2 cm. in length, bearing at the knob like apex a whorl of 3 to 5 fruits; pedicels 4 to 7 mm. long, articulate at the base; fruit at first stage of maturity lemon yellow, ultimately becoming soft and turning to a dark wine color, subglobose or more tapering toward the apex, 5 mm. thick, in the dry state ovoidly angular, 4 to 5-ovuled but only 1 to 3 develop to seeds; seed straw brown, plump, 3.5 mm. long, fully 2 mm. thick, the base and apex bluntly pointed, the angles rounded; the undeveloped seeds much flattened, subfalcately obovate from the side view, with a conspicuous browner colored embryo.

Type specimen 9535, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

Interlacing shrubberies and climbing over stocky trees on a wind beaten ridge at 4000 feet. Called "Tagima-itam".

It must not be confused with 5762 collected by *E. D. Merrill* on mount Halcon and which is the type of *S. foetida Merr.* It is however, identical with 7678 of the same collector from the same mountain. The infrutescence and foliage of our species are much larger.

OLEACEÆ.

LINOCIERA Sw.

Linociera rubrovenia Elm. n. sp.

A tree, 10 m. high; branches crooked, quite rigid except the numerous rather lax branchlets; wood moderately hard, whitish, odorless, slightly bitterish; twigs lenticelled, ashy gray, at the points of branching subtended by a fringe of brown adpressed scales. Leaves coriaceous, glabrous, dark green and conduplicate on the upper side, lighter beneath, recurved especially toward the tip, oblong, 10 cm. long, nearly one half as wide across the middle, apex abruptly acute, base cuneate, oppositely scattered along the glabrous younger portions of the twigs, margins entire; petiole 1 to 1.5 cm. long, glabrous, light green, articulate at the base; axillary buds present in nearly all the leaf axils; nerves brown in the dry state, more conspicuous beneath, the 6 to 8 lateral pairs ascending, the ends only faintly united, reticulations obscure. Inflorescence paniculately branched, below the leaves but upon the same young twigs; main branches 5 cm. long, glabrous, opposite, articulate at the point of attachment, branched above the middle; secondary peduncles and 2 to 3 mm. long pedicels also glabrous, articulate and subtended by bracteoles; calyx persistent, 3 mm. broad, quite rigid, finely puberulent especially along the margins, the 4 segments obtuse; corolla creamy white, glabrous, 2.5 cm. long, the 4 thick segments adnate; stamens 2, included; filaments very short; anther 1.5 mm. long, 1 mm. broad, bifid at the apex, dehiscing laterally; fruit not seen.

Type specimen 10224, *A. D. E. Elmer*, Dumaguete, Cuer-

nos Mountains, Province of Negros Oriental, Negros, June, 1908.

Rare, in dense woods at 4500 feet. Very floriferous, the individual flowers subpendulous and entirely odorless.

As to the known Philippine species it is quite similar to *L. luzonica* (*Blm.*) *F. Vil.* based upon 1479 *Cuming*. The inflorescence of our specimen is chiefly beneath the leaves, not axillary, and the leaf nerves in the dry state are deep brown. The brown adpressed bracts surrounding the base of the young twigs in our specimen are entirely lacking in the other species.

APOCYNACEÆ.

CARRUTHERSIA Seem.

Carruthersia hirsuta Elm. n. sp.

A climbing shrub; stems flexible, greenish brown, round, soft with a large pith, the twigs grayish brown in the dry state and covered with olivaceous hairs; bark milky. Leaves opposite, distantly scattered, ovately elliptic, apex sharply acute, base usually subcordate, margins entire, coriaceous, paler green beneath, nearly flat, with age entirely glabrous on the upper side, when young hirsute, exceedingly variable in size, the larger blades 18 cm. long and about one half as wide across the middle, beneath subglabrous and yellowish green, hirsute long the nerves and the more prominent reticulations; petiole hirsute, 3 to 5 cm. long, mostly twisted at the base; midvein very prominent beneath, grooved along the upper side; the lateral 5 to 7 pairs divaricate, their tips ascendingly curved and interarching, all yellowish hirsute, cross bars quite numerous but faint, the fine reticulations obscure. Flowers not seen; peduncle of infrutescence 1.5 dm. long, sparingly branched toward the top, ligneous, glabrous, from the leaf axils or from the axils of their scars, subpendulous; pedicels 1 to 2 cm. long; fruits green, hard, glabrous, strongly grooved, freely bleeding with white juice when injured, 1 to 2 cm. thick, 2 dm. long, similarly tapering at both ends, pendulous, heavy, laterally dehiscing from the apex to the base into 2 similar halves; seeds rather numerous, arranged

in a single row on each side of the thin brown colored septum and attached along the ventral edge, 1.5 cm. long, linearly oblong and irregularly twisted, dark brown, rugose or deeply cracked in the dry state, usually grooved on the ventral or flattened side, contracted and somewhat expanded at the distal end which bears the 3 cm. long silky coma.

Type specimen 8899, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

Found along the Sablan river above the barrio of the same name.

Certainly of the same genus as *Cuming* 1783, a cotype of *Carruthersia pilosa* (*A. DC.*) *F. Vil.*, and may prove to be only a very large leaved variety. There are several very closely related species of this genus in the Philippines.

Carruthersia imberbis Elm. n. sp.

Scandent; stem 1.5 cm. thick, tough, covered with reddish brown bark; sap milky. Leaves subcoriaceous, oppositely scattered along the branchlets, lucid and conduplicate on the upper side, glabrous, tips recurved, beneath sprinkled with brown or coal black dots, the average blades 1 dm. long and nearly one half as wide across the middle, elliptic, the apex abruptly terminating into an acuminate or subcaudate point, base obtuse or rounded, margins entire; petiole also glabrous, 2 to 3 cm. long; nerves prominent, especially beneath, the 6 to 8 lateral pairs oblique, their ends interarching, the cross bars rather numerous and comparatively faint. Inflorescence terminal, corymbosely paniculate, yellowish green puberulent, 1 dm. long, less than that across the top; peduncles usually 3, strict, subcompressed, branched above the middle or only toward the top, subtended by a pair of small leaves, the secondary and ultimate ones subtended by linear foliaceous bracts; flowers quite numerous and clustered at the ends, whitish; pedicel 2 mm. long, minutely pubescent, subtended by small unequal bracts; calyx similarly pubescent and about as long as the pedicels, united below the middle; segments 5, triangularly acute, glabrous on the inner side; corolla 3 mm. long, 2 mm. thick, urnshaped, only the upper one third cleft into 5 teeth, scan-

tily bearded on the inner side at about the middle; segments rigid and dark colored at the apex; stamens 5, included, alternating with the corolla segments, erect; filaments glabrous, subcompressed, brown, 1 mm. long, inserted upon the corolla 0.5 mm. from the base; anther 1.5 mm. long, basifixed, elongated, triangularly acute, the base deeply bilobed, the pair of pollen sacs above the middle and on the inner side; ovary superior, surrounded by a glabrous rim 0.5 mm. deep, 0.75 mm. high, about as thick, short and columnar, glabrous, except the light brown ciliate hairs at the apex; style central, glabrous, strict, 0.25 mm. long, with a funnel shaped rim; stigma twice as long, conically elongated or the tip more constricted and becoming mucronate in appearance; fruit not seen.

Type specimen 9239, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

Collected it in dense humid woods at 1500 feet along the road between Lucban and Sampaloc. This same species has more recently been sent in by *Mrs. Clemens* from the lake Lanao region of central Mindanao.

CONVOLVULACEÆ.

ERYCIBE Roxb.

Erycibe dubia Elm. n. sp.

A liana like climber; branches numerous, forming tangled masses; bark yellowish gray, becoming thinly checked longitudinally. Leaves recurved and shallowly conduplicate on the upper lucid side, paler green beneath, coriaceous, oblong or frequently a trifle oblanceolate in outline, apex abruptly acute, base obtuse, varying in size, the blades 12 cm. long by 5 cm. wide across the middle, glabrous on both sides or only the midnerve beneath and toward the base supplied with a few hairs, entire, alternatingly scattered; petiole 1 cm. long, finely rugose in the dry state, when young covered with short yellowish brown stellate hairs, ultimately becoming glabrous; nerves oblique, the 5 to 7 pairs not very prominent, the reticulations obscure but evident from below. Infrutescence erect, axillary and terminal, the main spike varying from a few to 15 cm. long,

covered with a dense yellowish woolly matrix; pedicels 1 to 1.5 cm. long, divaricate, ebracteolate or bracts very small and caducous; calyx persistent, spreading, 1 cm. across, yellowish tomentose on the outside, imbricate; the 5 segments united at the base, rigid, orbicular, 4 mm. broad; fruit 2 cm. long, ellipsoid, hard and velvety green, turning yellowish from apex toward base and becoming softer; the green deeply corrugated cotyledons surrounded by a juicy yellow meat; flowers not seen.

Type specimen 10342, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

Looping amongst wooded jungles of a very steep nearly precipitous gorge along the Bonyao river at 1500 feet.

Doubtfully related to *E. angulata Prain* and *E. macrophylla Hallier, f.*

ACANTHACEÆ.

ERANTHEMUM R. Br.

Eranthemum fruticosum Elm. n. sp.

A widely and laxly branched shrub, 2 to 3 m. high; branches sparingly rebranched; the ultimate ones suberect; stems 3 cm. thick, soft and watery, with a large pith; bark yellowish, smooth, green beneath the epidermis. Leaves opposite, more or less crowded at the ends of the rather elongated suberect branchlets, very smooth on both sides but much paler beneath, radially spreading, flat and gracefully recurved, 1.5 to 2.5 dm. long, from 7 to 10 cm. wide across the middle, entire, glabrous throughout all stages, gradually tapering to an acute or acuminate point, slenderly attenuate at the base, occasionally curved and somewhat inequilateral especially toward the base; petiole also glabrous, averaging 3 cm. long; nerves very conspicuous from both sides, brown or nearly black in the dry state, about 9 to 11 on each side, much ascending, tips faint and obscurely united, cross bars and coarse reticulations scant and very faint. Spike never branched, erect, strict, terminal, green, glabrous, 4 dm. long including the 1 dm. long peduncle; fruits bunched and alternatingly scattered or occasionally subwhorled, subtended by acuminate subglabrous bracts; pedicel in the

fruiting stage 5 mm. long; calyx united at the very base, 8 mm. long, the 5 slenderly acuminate segments minutely glandularly punctate on the outer side, persistent; ovary 3 mm. long, conically elongated, glabrous; style filiform, subpersistent, subglabrous or finely pubescent below the middle, strongly curved; fruits not mature, 5 cm. long, smooth, the lower one half constricted, that portion above the middle expanded and subcompressed, terminated into a stout 5 mm. long point; immature seeds 4, very flat, 5 mm. across, set upon rigid sharply curved retinaculae.

Type specimen 9619, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

Only one plant of this species was observed by me while in that region for four months. It was found on a very steep deeply shaded ravine near a stream at 2500 feet. In its habitat it is most distinct from all other Philippine species so far known. Some of the Visayan people know it as "Bankaro."

Not *E. curtatum C. B. Clarke* nor its allied species *E. crenulatum Nees*, *E. malaccense C. B. Clarke* and *E. andersoni Mast.* It is very different from *E. haenkeanum Ness*, and *E. bicolor Schrank.*, a species with dark blotched flowers.

HEMIGRAPHIS Nees.

Hemigraphis sublobatum Elm. n. sp.

Herbs, suberect or reclining, from a few cm. to 3 dm. high; stems delicate, dirty and bristly pubescent, branched from the lower leaf axils. Leaves opposite, greatly varying in size and shape, thin, horizontally spreading, green above and with darker green veins, beneath much lighter green and veins often tinged with purple, pseudostrigose on both sides, the average blades 3 to 5 cm. long, 2.5 cm. wide, ovate in outline or oblongish or even elliptic, apex obtuse or rounded, base subtruncate or rounded, 3 to 5-lobulate, the lobulations blunt, the smaller bract like leaves subentire or nearly undulate; nerves very faint, 2 to 3 pairs, beneath usually dirty yellowish pubescent, ascendingly curved; petiole not exceeding 2 cm. long, pubescent, slender, those

of the smaller leaves nearly obsolete. Flowers from the uppermost leaf axils, subtended by foliaceous bracts, erect or ascending, solitary, subsessile; calyx glabrous except the sparsely ciliate segments, green, not exceeding 8 mm. in length, turbinate, the basal 2 to 3 mm. united, otherwise divided into 5 setose segments; corolla white or occasionally tinged with red, purplish streaked toward the base, glabrous, cylindric from below the middle, saccately inflated from a trifle below the middle, nearly 1.5 cm. across at the throat, about 2 cm. long, delicate and rather early falling; the 3 lobes subequal, broadly rounded; stamens whitish, inserted upon the corolla somewhat above the middle; filament 0.5 mm. long; anther 1.5 mm. long, subtruncate at the apex, bilobed at the base; ovary glabrous, 3 mm. long, elongated; style also glabrous, filiform, terminating in a linear stigma; capsule 1 cm. in length, subglabrous, straw brown in color, linear, dehiscing laterally, the halves becoming much recurved, about 12-seeded, the seed set in retinacula arranged in alternating superimposed rows; seeds suborbicular, flattened, light brown, finely ciliate along the margin.

Type specimen 9665, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908.

This species forms small mats in rock crevices of cliffs near the Bonyao river and in well shaded talus beds at 2500 feet. Known to the natives as "Pisow-pisow-na-balagon".

RUBIACEÆ.

PSYCHOTRIA Linn.

Psychotria diffusa cervina Elm. n. var.

Primarily distinguished from 152 *H. N. Whitford* of mount Mariveles by the fuligineously colored tomentose inflorescence.

Type specimen 9800, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

Collected on a windswept ridge at 4000 feet.

CAMPANULACEÆ.

PRATIA Gaud.

Pratia ovata Elm. n. sp.

Soft annual; stems trailing, green, subglabrous, 1 mm. in diameter, taking root at the joints; branches alternate, suberect, delicate. Leaves alternatingly scattered along the branchlets, thin or subflaccid, flat, somewhat lighter green beneath even in the dry state, upon a green and sparsely strigose or nearly glabrous 5 mm. long petiole, ovate or subrotund, subglabrous on both sides, entire or minutely crenately toothed, apex obtuse, base broadly obtuse to rounded or even subtruncate, the normal blades 1.5 cm. long and 1 cm. wide below the middle; nerves about 3 on each side, strongly oblique, occasionally provided with dirty strigose hairs, very obscure from the upper side. Flowers solitary from the upper leaf axils; pedicels from 3 to 5 or even 8 mm. long, green and pubescent when in anthesis, straw color and glabrous when in fruit; calyx 4 to 5 mm. long, green, pubescent below the middle, divided to the middle into 5 glabrous ligulate segments; corolla whitish, about as long as the calyx, apparently 2-lipped, the lower lip cleft and ciliate toward the apex on the outer side, the upper one unequally 3-lobed, all the segments readily separating nearly to the base; stamens included; anthers connate at their tips and bearing tuftlets of ciliate hairs, oblongish, 1 to 1.5 mm. long; filaments finely winged, subglabrous; style terete, glabrous, strict, bearing a small sparsely ciliate terminal stigma; berry ellipsoidal, crowned by the calyx teeth, 5 mm. long, 3 mm. in diameter, indehiscent, the thin sides ultimately bursting to allow the seeds to escape and leaving the strong longitudinal ridges intact; seeds numerous, brown, smooth, less than 0.5 mm. in length, nearly as wide, distinctly 3-angled.

Type specimen 9099, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

Rare in clayey soil of woods at 2500 feet of mount Banahao.

Its berry like fruits, not capsules, place it with *Pratia*, yet its triquetrous seed is a character of *Lobelia*. From de-

scriptions it seems to be related to *L. trigona Roxb.* and *L. chinensis Lour.* but is distinct from either.

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LEAFLETS OF PHILIPPINE BOTANY

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SYNOPSIS OF FAGRAEA

BY

A. D. E. ELMER.

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FAGRAEA Thunb.

Trees, shrubs, scandent or epiphytes. Leaves opposite, mostly thick and rigid, entire; petioles plated or dilated at the base. Inflorescence corymbs, racemes or elongated panicles, terminal or axillary, bracts small. Flowers large or rather small, white and mixed with a tinge of yellow, occasionally pink; the 5 calyx lobes shallow or sometimes cleft, broad, much imbricate, usually thick and rigid, with thinner margins; corolla tube long, the basal portions tubular, otherwise campanulate or funnel shaped; lobes 5, broad, twisted to the left in the bud; stamens 5, the filaments filiform or flattened; anthers oblong, usually cleft at the base; ovary mainly 2-celled; style filiform, stigma capitate; ovules numerous; seed immersed in a pulp, brown; testa crustaceous; albumen horny.

Species about 30. In India, Japan, Malay Archipelago, Australia and in the Pacific Islands. Eight in the Philippines.

Key to the Philippine species of *Fagraea.*

Racemes more or less elongated and subpendulous.
1. *F. morindaefolia*

Inflorescence otherwise.

Flowers never exceeding 2 cm. in length, numerous and forming a compound corymb.
2. *F. fragrans.*

Flowers much larger, fewer and forming a simple cyme.

Leaves 3 to 5 dm. long by 10 to 15 cm. wide, leathery.

Tubular flowers 7 to 15 cm. long.
3. *F. langiflora.*

Funnel shaped flowers 3 to 5 cm. long.
4. *F. plumeriaeflora.*

Leaves less than 3 cm. long and 8 cm. wide, rigid.

Calyx 2 to 3 cm. long, 1 to 2 cm. thick; berries olive green.

Corolla 3 to 5 cm. long.
5. *F. obovata.*

Corolla twice as long.
6. *F. auriculata.*

Calyx much smaller, berries yellow.

Segments persistent in fruit.
7. *F. negrosénsis.*

Segments deciduous in fruit.
8. *F. cuernosensis*

1. **Fagraea morindaefolia Blm.** in *Rumph.* 2, t. 73; 32.

A suberect or scrambling shrub. Leaves large, oblong or elliptic, apex rounded and terminated by a short acuminate point, base truncately rounded or subcordate, rigid, lucid green above, paler beneath; veins 7 to 11 pairs, darker brown in the dry state; petiole 1 to 3 cm long. Raceme glabrous, terminal, 2 to 5 dm. long, subpendulous; flowers clustered in more or less irregular intervals, the short peduncles subtended by bracts; calyx subtended by a pair of acute bracteoles, its segments rounded and thinly margined; corolla nearly 2 cm. long, tubular towards the base, the upper one half campanulate; segments 8 mm. long, broadly rounded at apex.

Represented by 7160, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, 1906.

A seacoast species, common from middle Luzon southward and especially abundant in Mindanao.

2. **Fagraea fragrans Roxb.** in *Hort. Beng.* 84

A small tree, 8 m. high. Leaves 3 cm. wide, 10 cm. long, elliptic, acute at both ends; petiole 12 mm. in length; stipules often connate. Corymbs mostly from the upper leaf axils, numerously flowered; pedicels 5 mm. long; calyx deeply divided, the lobes rounded; corolla nearly 12 mm. long, cylindric towards the base, the upper portion narrowly funnel shaped; throat 6 mm. wide, the obtuse lobes 5 mm. long; stamens much exerted; berry 6 mm. in diameter, subglobose, reddish when nature.

Represented by *H. M. Curran* (Forestry Bureau record 4501), Island of Palawan, May to June, 1906.

This handsome tree extends into the Philippines through Palawan island as far north as Mindoro. Rare.

3. **Fagraea longiflora Merr.** in Philip. Journ. Sci. 3, Sect. C; 260, 1908.

Suberect 5 m. high shrub or more often epiphytic upon limbs of large trees; branches sparingly branched but rather rigidly spreading, the ultimate ones thick and subreflexed. Leaves leathery, very variable in size, crowded toward the ends of the twigs, dark green above, much paler beneath, apex abruptly acute, base long attenuate, decurrent to the very strong midrib clear to and usually with a pair of lobes at the base, broadly oblanceolate, glabrous, the largest ones 3 dm. wide above the middle by 1 m. long but usually much smaller; veins 9 to 13 pairs, ascending, reticulations not evident. Infrutescence clustered in axillary glomerules, 7 cm long, 3 to 5 or even 7-fruited but only a few of each glomerule maturing, upon short woody stalks; fruits subsessile, olive green, subtended by rigid bracts of diverse size and shape, elliptic to obovoid, smooth, hard, green except the brown apical disk which extends into a conspicuous point, 4 cm. long or longer, about 3 cm wide, half exerting the turbinate involucre; the bracts immediately sub-

tending the fruits irregularly, abruptly rounded but the apex extended into an involute point closely overarching the young fruits.

Represented by 7503, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906.

A rare and very characteristic species in damp wooded ravines from 2000 to 3000 feet of mount Banahao and in similar places on mount Maquiling. Collected and distributed by the writer under a provisional new name, prior to its being recollected by *Messrs. Curran* and *Merritt* in the same region.

Is number 838 *Cuming*, and on which *Candolle* based his description of *F. plumeriaeflora*, a mixture? My field experience in that region failed to reveal such a combination, and I am inclined to believe that the flowers of *Cumings'* number belong to a different species; the characteristic leaves of *Candolle's* species are unmistakably of the same species as that of *F. longiflora Merr.*

4. **Fagraea plumeriaeflora DC.** Prod. 9; 29, 1814.

Leaves oblong to elliptic, rather leathery, margins slightly involute, somewhat paler beneath in the dry state, short acute at the apex, base obtuse, glabrous on both sides, 25 to 40 cm. long, 10 to 15 cm. wide across the middle; petiole 3 to 7 cm. long, subterete; nerves 9 to 13 pairs, quite prominent beneath, the midvein very stout; stipules rotund. Terminal peduncle 3-flowered; peduncle subcompressed, as long as the petioles; subtending bracts rigid, obtuse, 1 cm. long; calyx 3 cm. long, the basal portion pedicel like; the acutely rounded segments 1 cm. long, with thin margins; corolla 3 to 5 cm. long, funnel shaped; the obovate segments 2 cm. in length

Represented by 838, *Cuming*, collected either in the Province of Tayabas or of Albay, Luzon.

See note under *F. longiflora Merr.*

5. **Fagraea obovata Wall.** in *Roxb.* Fl. Ind. 2; 33.

A subscandent shrub. Leaves thick, obovate to oblong or even elliptic, 9 by 18 cm., base narrowed, rounded or abruptly acute at apex, the lateral veins very obscure; petiole varying from 1 to 3 cm. in length; stipules interpe-

tiolar. Cymes rigid, comparatively few flowered; pedicels short; glabrous calyx 15 mm. long, the lobes broadly rounded to obtuse; corolla 3 to 5 cm. long, the basal one third tubular, the upper portion campanulate and 2 cm. wide across the throat; lobes 1.5 cm. long, oblong to obovate, obtuse or rounded at apex; stamens and pistils mainly included; berry nearly 3 cm. long, 2 cm. in diameter, ovoid.

Represented by 9107, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906.

In humid woods from near the sea level to 5000 feet elevation throughout the Philippines, but nowhere abundant.

6. **Fagraea auriculata Jack.** in Malay. Misc. 2, N. 7; 82, 1822.

Large shrub. Leaves very thick, oblong or occasionally obovate, acute at both ends or more attenuate towards the base, 4 to 7 cm. wide, 10 to 15 cm. long, rigid; petiole 1 to 3 cm. long, thick and auricled at the base; lateral veins scarcely visible. Cymes 1 to 5-flowered, terminal; pedicels stout, subcompressed, less than 1 cm. long; calyx 3 cm. long, subtended by a pair of acute bracts, thick and rigid; segments cleft nearly to the base, oblong, apex obtuse, 1.5 cm. wide; corolla 10 cm. long, the lower one third tubular, the upper portion widely funnel shaped; lobes very broad, rounded or subtruncate, oblong to obovate; stamens included; pistil equalling the throat; berry ovoidly elongated or ellidsoid, yellowish green.

Represented by *W. F. Foxworthy* (Bureau of Science record 642), Mount Victoria, Island of Palawan, March to April, 1906.

Apparently rare, and so far known only from Palawan and from mount Banahao.

7. **Fagraea negrosensis Elm.** n. sp.

Scandent and forming tangled bushes; stems soft, 3 to 5 cm. thick; bark quite smooth, yellowish gray; twigs not numerous, suberect, rather rigid. Leaves flat except the short recurved tips, ascending, the older ones spreading, very coriaceous, equally smooth on both sides, dull green above, somewhat lighter beneath, obovate, the larger ones 2 dm. long,

6 cm. wide above the middle, the entire callous margin minutely involute, the apex rounded and usually terminated by a short acute point, the base gradually attenuate; the midnerve prominent beneath, the 6 lateral pairs faint especially toward the ends; petiole glabrous, lenticelled, 2 to 4 cm. long, the base provided with a square obscurely 2-toothed plate. Terminal inflorescence 7 cm long, about as wide across the top, 2 to 3-ternately branched; the stalks covered with yellowish brown irregularly shaped escrescences; bracts rigid, obtuse, nearly 1 cm. long; calyx 1 cm. long, subtended by a pair of small obtuse bracts, never more than 6 mm. thick across the top; the 5 segments broadly rounded and very shallow, thinly margined, imbricated, in the fruiting state spreading; corolla 5 to 6 cm. long, glabrous, creamy white, narrowest across the middle, 1 cm. wide at the throat; segments one fourth the entire length, 5, rounded or occasionally subemarginate, gradually recurved, imbricated and in the bud state twisted towards the left, oblong, broadly obtuse, not wider than 1 cm.; stamens 5, chiefly included; filaments whitish, glabrous, flattened, inserted upon the corolla tube at about the middle; anthers versatile, oblong, 7 mm. long, split at the base; ovary elongated, glabrous; fleshy style also glabrous, whitish, equalling the stamens; stigma a subcapitate disk, finely papillate, dark green; fruits 3 to 5 cm. long, 1.5 cm. thick near the base which usually is rounded or subtruncate, gradually tapering to the elongated point, lemon colored when ripe, longitudinally divided by a thin partition; seeds brown, 1.5 mm long, oblong, minutely pitted; berry when dry rather odorous and exceedingly bitter.

Type specimen 9839, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

This species is quite plentiful in the woods at 4000 to 5000 feet altitude of south Negros, and has also been collected in the Zambales mountains of Luzon. It belongs to the *F. obovata Elm.* group, but can be distinguished by the yellow differently shaped berries and by the small persistent calyx segments.

8. Fagraea cuernosensis Elm. n. sp.

Tree 8 m. high; limbs chiefly toward the top, ascending,

rigid, covered with gray bark. Leaves opposite, usually crowded toward the ends of the twigs, very thick, easily cracking, flat, ascending, dark and sublucid above, somewhat glaucescent beneath, glabrous base cuneate, apex obtusely rounded, obovate, 1 to 2 dm. long, 5 cm wide above the middle, the callous margins minutely involute; midvein very prominent, the 5 to 7 lateral ones very faint; petiole 1 to 3 cm. long, thick, provided at the base with thick square and bidentate plates Bud inflorescence terminal, erect, 7 cm. long, about as wide across the top, ternately forked once or twice; stalks subcompressed, provided with brown irregularly shaped excrescences, subtended by a pair of thick rigid 1 cm. long bracts; the middle bud subsessile, the 2 lateral ones stalked; calyx glabrous, 1.5 cm. long, thick except the margins, very smooth on the inner surfaces; segments 5, rounded at the apex, two thirds the length of the calyx, the outer 3 enclosing the inner 2, becoming deciduous and leaving a thick shallow rim; corolla and stamens not seen; bud ovary elongated, 5 mm. in length, subglabrous; style one half as long, puberulous, terminated by a broad stigmatic disk; fruits 2 cm. long, 1 cm. thick, dull yellow when mature, smooth and shiny, both ends similarly obtuse or subtruncate, the 3 mm. wide corky base conspicuous and yellowish gray, the apex abruptly terminated into a dry very prominent yellowish gray blunt point nearly 5 mm. in length, longitudinally divided by a membrane like septum; seeds very numerous, brown, oblong, minutely pitted, 1.5 mm. long by 1 mm. thick; dry berry somewhat fragrant but extremely bitter.

Type specimen 9915, *A. D. E. Elmer*, Dumaguete, Cuernos mountains, Province of Negros Oriental, Negros, April, 1908.

Only one or two trees were observed in the shallow wooded crater of the Cuernos mountains at 6000 feet, and has also been collected at the same elevation in the Malindang mountains of Mindanao.

It is closely related to the preceding species but the fruit is less tapering towards the apex and is set upon a corky base; and the calyx segments are entirely deciduous in the fruiting state.

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ZINGIBERACEAE FROM SOUTH NEGROS

BY

HENRY N. RIDLEY.

(*Dir. Botanic Gardens, Singapore, Straits Settlements*).

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ADELMERIA* Ridl.

Adelmeria bifida Ridl. n. comb. *Elmeria bifida Ridl.* in *Elmer's* Leaf. Philip. Bot. 2; 569, 1909. *Hornstedtia paradoxa Ridl.* in Govt. Lab. Publ. 35; 85, 1905.

Negros, Cuernos mountains, Dumaguete, (*Elmer* 9637).

ALPINIA Linn.

Alpinia brevilabris Presl.

Negros, Cuernos mountains, Dumaguete, (*Elmer* 9501 and 9531).

Alpinia haenkei Presl.

Negros, Cuernos mountains, Dumaguete, (*Elmer* 10244).

* The genera *Elmera* and *Elmeria* would stand as other genera similar in name have stood; but to prevent some one who is more of a bibliographical worker than a plant student from making a change, the author, *Dr. Ridley*, suggests that *Elmeria* be altered to *Adelmeria*.
A. D. E. E.

Alpinia pyramidata Blm.

Negros, Cuernos mountains, Dumaguete, (*Elmer* 10314).

Alpinia rufa (Presl) K. Sch.

Negros, Cuernos mountains, Dumaguete, (*Elmer* 9578).

Alpinia musaefolia Ridl. n. sp.

About 6 metres tall, stems 2 to 3 together, 14 cm. through at the base. Leaves 3 to 5 on a stem 14–20 cm. apart oblong glabrous subherbaceous 1.20 m. to 2.10 m. long, 24 cm. wide, midrib stout, dark green above, paler beneath, petiole short, 1 dm. long only. Inflorescence terminal glabrous spicate, peduncle 30 cm., 2 cm. thick rachis stout 60 cm. Flowers subsessile, pedicel thick 3 mm. Calyx campanulate broad 1 cm. long lobes short rounded glabrous green. Corolla tube as long thick, lobes broad oblong thick textured succulent, upper one hooded 1 cm. long, white lip a little longer, fleshy with thinner edges lanceolate boat shaped entire narrow apex blunt entire with central veins. Staminodes rather large linear oblong fleshy glabrous obtuse. Anther linear oblong the connective slightly prolonged and emarginate. Fruit obovoid 1.5 cm. glabrous smooth.

Negros, Cuernos mountains, Dumaguete at 4000 feet elevation, (*Elmer* 9539); a remarkable plant for its banana like size and habit, and absolutely glabrous in all parts. Its nearest affinity is with *A. glabrescens Ridl.*

AMOMUM Linn.

Amomum fusiforme Ridl.

Negros, Cuernos mountains, Dumaguete, (*Elmer* 9509).

Amomum lepicarpa Ridl. n. sp.

Stems 3 to 5 metres long, 3 cm. through at the bulbous base. Leaves about 12-14 cm. apart coriaceous dark olive green polished above paler beneath linear oblong base rounded, apex acute 60 cm. long 10 cm. wide quite glabrous, petiole 2 cm. long channelled above back rounded ligule 1 cm. oblong truncate. Inflorescence radical on a 9 cm. peduncle with rather distant lanceolate bracts. Bracts narrow lanceolate acuminate ribbed glabrous. Bracteoles narrow lanceolate acum-

inate ribbed 2.5 cm. by 4 mm. wide, inner bracteole shorter strongly ribbed pungent mucronate, all glabrous. Ovary sparingly pubescent. Calyx tubular with 3 lanceolate mucronate pungent lobes, tube pubescent, 2 cm. Corolla tube little longer hairy, lobes linear oblong obtuse 7 mm. long. Lip entire horizontal linear dilated at the tip gradually into a rounded limb emarginate in the centre 1 cm. long 5 mm. across. Anther linear oblong apex retuse crestless. Infrutescence ovoid or subglobose 8 cm. long and about 6 cm. through; fruit globose reddish 1.5 cm. long ferruginous tomentose with short erect scattered warty processes at the tip, calyx tube long persistent

Negros, Cuernos mountains, Dumaguete, (*Elmer* 10044). In wooded ravines on the edge of the river at 2750 feet. The form of the flowers is like that of a *Hornstedtia* but the inflorescence, fruit and bracts that of an *Amomum*.

Amomum lepicarpa pubescens Ridl. n. var.

Leaves larger and more narrowed to the base, margins distinctly undulate, sheaths and petiole pubescent. Bracts wider. Fruits more rufous tomentose.

Negros, Cuernos mountains, Dumaguete, (*Elmer* 10384). In moist fertile soil of dense shrubberies at 3500 feet. This may be a distinct species but is very closely allied to the type. The flowers are in a bad state for dissection.

GLOBBA Linn.

Globba gracilis K. Sch.

Negros, Cuernos mountains, Dumaguete, (*Elmer* 10033).

HORNSTEDTIA Retz.

Hornstedtia philippinensis Ridl.

Negros, Cuernos mountains, Dumaguete, (*Elmer* 10270).

Hornstedtia conoidea Ridl. n. sp.

Stems clustered 3 metres long 3 cm. through at base, base swollen. Leaves oblong lanceolate shortly cuspidate, base very shortly rounded narrowed 45-55 cm. long, 8-14 cm. wide, above glabrous, beneath sprinkled with silky hairs more abundant on the midrib and margin, petiole very short (1 cm.

in some parts of the stem) pubescent, ligule truncate densely hairy, sheath reticulate sparingly hairy above. Spike subsessile red ovoid conic 7-8 cm. long. Bracts ovate to ovate lanceolate acute rather softly coriaceous red, ribbed finely and white silky at the base 4 cm. by 1.5. Flowers 7.5 cm. long. Calyx red tubular silky hairy at base becoming glabrous upwards 5 cm., split on one face, lobes acute tipped with hairs. Corolla red tube 7 cm. slender, lobes oblong obtuse 1-5 cm. rather narrow lip entire fleshy 2 cm. margin white blunt sides up curved; anther hairy with a thin rounded short crest.

Negros, Cuernos mountains, Dumaguete, (*Elmer* 10246). In fertile soil of damp ravines at 2000 feet altitude. Native name Tagbac.

Hornstedtia microcheila Ridl. n. sp.

Stems from 1 to 3 metres long recurved or drooping yellowish green rigid less than 1.5 cm. thick except the reddish very much enlarged bulbous bases, several in a somewhat scattered cluster. Leaves subcoriaceous linear oblong cuspidate 20-24 cm. long, 5 cm. wide glabrous above the peel pubescent beneath margin glabrous reddish brown, petiole 1 cm. puberulous ligule oblong rounded half as long sheath pubescent above reticulate. Inflorescence small ovoid 4 cm. long on a peduncle about as long covered with ovate bracts ribbed and pubescent. Inflorescence bracts few ovate the biggest 3 cm. by 1.5 across, coriaceous mucronulate margin ciliate thinner, ribbed pubescent, all red. Ovary glabrous with a thick tuft of silky hairs at the top. Calyx tubular 4 cm. long with a few silky hairs at the base, glabrous above except for the two acuminate lobes tufted with hairs. Corolla pink, tube 5 cm. long upper lobe ovate oblong obtuse 7 mm. lower ones narrower linear oblong. Lip creamy white base 1 cm. long with 2 short narrow lobes, as long as the anther, base narrow with the sides up curved and terminated by a rounded crisped limb, disc at base silky hairy sparingly. Anther very short glabrous retuse at tip. Stigma large clubbed.

Negros, Cuernos mountains, Dumaguete, (*Elmer* 10279). On seepage cliffs along the river at 3000 feet. The smallest

flowered species of the section and remarkable too for its white lip, unusual in the genus.

Hornstedtia lophophora Ridl. n. sp.

Stems 6 metres tall 3 cm. thick base bulbous, 12 cm. through. Leaves lanceolate oblong slightly narrowed at the broad base 69 cm. long 15 cm. wide above glabrous beneath silky velvety midrib prominent silky petiole 2 cm. but blade decurrent to base, ligule 1 cm. covered with tufts of silky hairs in transverse lines. Sheath striate, with small round or linear pustules each bearing a tuft of silky hairs. Inflorescences clustered scarlet red, on peduncles 1 cm. thick covered with dense silky hairs. Spike 4-5 cm. long ovate. Bracts ovate acute pungent glabrous red longitudinally striate with rather high narrow ridges with a line of pustules or transverse bar between each rib, inner bracts lanceolate. Flowers not seen. Fruits glabrous 2 cm. long flattened elliptic, beaked, with the remains of the calyx, finely ribbed, thin walled with numerous oblong to pyriform seeds irregular in form but usually truncate 2 mm. long.

Negros, Cuernos mountains, Dumaguete, (*Elmer* 10365). In fertile glens at 4000 feet altitude.

As a rule it is not advisable to describe a *Hornstedtia* without seeing the flowers, but an exception may be made in this curious species. The peculiar sheath and ligule as well as the small flattened fruit is quite unique in the genus. In some of the islands of the Eastern Archipelago, the sheath of the leaf is not only ribbed longitudinally but has transverse bars at interval, giving it a reticulated appearance. In this species the transverse bars are sometimes reduced to round pustules, bear tufts of silky hairs so that the sheath appears spotted over with white tufts and these tufts run into transverse lines on the ligule.

ZINGIBER Adans.

Zingiber mollis Ridl.

Negros, Cuernos mountains, Dumaguete, (*Elmer* 9843).

Zingiber sp. ?

Negros, Cuernos mountains, Dumaguete, (*Elmer* 10421).

LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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SYNOPSIS OF ARTOCARPUS

BY

A. D. E. ELMER.

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ARTOCARPUS Forst.

Evergreen trees. Leaves often 1 m. long and proportionately wide, alternate, chiefly chartaceous, occasionally coriaceous, entire, lobed or incised, pinnatinerved; stipules various. Flowers monoecious, densely crowded on globose, oblong, or obovoid receptacles which arise from the leaf axils or from the axils of their scars, rarely terminal; flowers unisexual, usually mixed with peltate and ciliated bracts; perianth of male flower 2 to 4-lobed; the lobes obtuse, concave, valvate or slightly imbricate especially in the bud state; stamen solitary, strict; perianth of the female flowers tubular, connate, minute, united below to the receptacle; ovary straight, style terminal or subterminal; stigma entire, rarely 2 or 3-lobed; ovule pendulous; fruit a large fleshy globose oblong or rugose receptacle, clothed with greatly enlarged perianths and carpels or anthocarps which later terminate into long hairy or spiculate tips, or which are pyramidal or even subtruncate; nut or achene deeply sunken in the fleshy pulp; seeds exalbuminous; embryo straight or incurved; cotyledons fleshy, equal or unequal, with very short radicle.

Species 40, widely distributed throughout tropical Asia and in the Pacific islands. In the Philippines we recognize 16 species, 3 of which yield edible fruits and the wood of most of our species is hard and heavy, yellowish, either with a distinct bitterish or sweetish taste, and is much employed for structural purposes. The gum is used in calking small boats and the coagulated milky sap is occasionally gathered by the natives for a substitute for chewing gum. The younger folks also use it in making simple bird traps. Slender bamboo poles are coated with it and horizontally placed among trees bearing edible bird fruits. When the bird alights on the gummed pole, he is unable to free himself from it. Nor is he given a decently fair time to accomplish a possible escape, since the captor usually lies in wait somewhere in the shade of the tree. The nuts of a few species are said to be roasted and used as food. The bark of young trees of some of our species is used by mountain tribes as "gee-strings".

Key to the Philippine species of *Artocarpus*.

Fruits large, hanging from the stem and larger branches.
1. *A. integrifolia*.

Fruits smaller, from the twigs or from the leaf axils.
Leaves large, at least occasionally lobed or incised.
Anthocarps terminating into slender tails.
2. *A. blumei*.

Anthocarps not tailed.
Fruit black.
3. *A. nigrescens*.

Fruits greenish or turning to a pale greenish yellow or even yellowish red.
Leaves always incised, moderately long petioled, upper surface glabrous; anthocarps elongated; male inflorescence long cylindric.
4. *A. communis*.

Leaves as in the above; anthocarps 1 cm. long, spiculate.
5. *A. communis blancoi*.

Leaves mostly entire, long petioled, gla-

brous above; anthocarps conical; male inflorescence short cylindric.

6. *A. tréculiana.*

Leaves entire or incised, short petioled, nerves on the upper side densely covered with yellowish hairs; anthocarps truncate; male inflorescence obovoid.

7. *A. odoratissima.*

Leaves usually smaller, never lobed or incised.

Foliage finely pubescent beneath.

Leaves subrotund, 29 by 16 cm.; male inflorescence 3. 5 cm. in diameter, subglobose, upon very short peduncles; irregular fruits 4 to 6 cm. in diameter.

8. *A. subrotundifolia.*

Leaves oblong, 25 by 10 cm.; male inflorescence obovoid, 1 to 3 cm. long, upon slender peduncles arising from the axils of the young twigs; irregular fruits 3 to 4 cm. in diameter.

9. *A. cumingiana.*

Leaves broadly oblong, 14 by 8 cm.; male inflorescence pyriform, less than 1 cm. long, upon short peduncles mostly arising from the second year old twigs.

10. *A. paloensis.*

Leaves narrowly oblong, 12 by 5 cm.; irregular fruits 2 cm. thick, axillary, upon peduncles at most 3 cm. in length.

11. *A. leytensis.*

Foliage glabrous beneath.

Leaves broadly oblong or subelliptic, the average ones 9 by 20 cm.; fruits quite regular.

12. *A. rubrovenia.*

Leaves not broadly oblong or subelliptic, much smaller; fruits irregular.

Foliage ovately elongated, with very short acute or obtuse apices.

13. *A. woodii.*

Foliage elliptic to oblong, lanceolate to oblanceolate.

Fruit one-seeded, 1.5 cm. thick; leaves lanceolate.

14. *A. lanceolata.*

Fruits at least several-seeded (unknown in *A. nitida* which has elliptic leaves).

Leaves 4 to 6 cm. long, elliptic, short ob-tuse or acute; petiole 5 to 10 mm. long.

15. *A. nitida.*

Leaves larger, oblongish lanceolate to oblanceolate, acute to acuminate or even caudate; petiole twice as long.

Syncarpia larger than 3 cm. across.

16. *A. lamosella.*

Syncarpia smaller.

17. *A. xanthocarpa.*

1. **Artocarpus integrifolia Linn. f.** Syst. Suppl. 412, 1781. *A. philippinensis Lam.* Encyc. 3; 210, 1789. *A. maxima Blco.* Fl. Filip. ed. 1; 669, 1837.

An evergreen tree, from 5 to 10 m. high; stem branched above the middle, forming more or less an umbrella shaped crown; branchlets rather slender, lax, smooth and glabrous, grayish. Leaves scattered, very variable, oblong to elliptic or obovate, always entire, chartaceous, darker green on the upper surface, apex acute to obtuse or even rounded and obscurely mucronate, base cuneate or obtuse, 1 to 3 dm. long, one half as wide; nerves very prominent beneath, 7 to 9 pairs; slender petiole 2 to 5 cm. long, glabrous; stipules also glabrous, rather large and lanceolate. Inflorescence either 1, 2 or 3 from the same woody tubercle, on the stem or along the larger branches, or the male inflorescence occasionally arising from the leaf axils, embraced by deciduous bracts; staminate spike 5 to 12 cm. long, 1.5 to 3 cm. in diameter, cylindric, greenish or pale yellow, sweetly fragrant; flowers without bracteoles; sepals 2, oblong or spatulate, with pubescent tips; fruit pendulous, oblong or obovoid, 3 to 5 dm.

long, heavy, yellowish when mature, the tips of the anthocarps pyramidal; the smooth oblong nuts surrounded by a yellowish sweet gummy meat.

This economic tree is the common "Jack-fruit" and extends throughout the Philippines. In the hemp fields of the southern islands it is especially luxuriant and abundant. In these favorable places it becomes spontaneous and thrives even at 3500 feet elevation. The natives call it "Nanka" and its fruit is found in all their markets. The gummy meat is sweetish and is much relished.

Originally discovered in the forests of the Western Ghats. Now found in cultivation throughout the warmer Pacific islands and southeastern Asia.

2. **Artocarpus blumei Tréc.** in Ann. Soc. Nat. 3 Ser., 8; 111, 1847. *A. pubescens Blm.* (not *Willd.* nor of *Moon.*) Bijd. 481, 1825.

Large spreading tree, 16 m. high; stems 6 dm. thick; branches from the middle, forming an elongated roundish top; the main branches thick and very stout, the ultimate ones suberect and 5 cm. thick; wood hard, burly, its comparatively thin sapwood white, otherwise yellow, with a faint greenish odor and sweetish taste; bark 2 cm. thick, reddish beneath the gray thinly checked surface, freely bleeding with a white juice which upon exposure turns reddish. Leaves obtuse at both ends, ascendingly spreading from the ends of the twigs, dry and chartaceous, entire or occasionally shallowly lobed above the middle, margins involute in the dry state, subelliptic, the larger ones 3 by 9 dm., conduplicate on the upper side especially toward the base, dull green above, much paler or even yellowish green beneath and along the midvein on the upper side; nerves 11 to 15 pairs, prominent, yellowish beneath, strict, oblique, faintly united along the margin; petiole hairy, 6 cm. long, very stout, caniculate on the upper surface, nodulose near the base of the blade; scar broad, very pronounced; stipule 1 to 2 dm. long, acuminately tapering from the base or more oblong in shape and terminating into an obtuse apex, yellowish in the fresh state, deciduous and turning brown, glabrous on the inner side, on the outer surface covered with long brown

hairs especially along the middle. Fruits 12 cm. long, somewhat less in diameter, greenish yellow when mature, heavy, subpendulous and solitary from the leaf axils; anthocarps dense, the free angular portion terminating into long ciliate appendages; nuts yellowish brown, less than 15 mm. in length, ellipsoid; peduncles 8 cm. long, subglabrous, thick; staminate inflorescence yellow, about 8 cm. long, the ends blunt, 3 cm. across the middle, conspicuously wrinkled.

Represented by 10307, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

First discovered by *Zollinger* along the Tjeliwung river near Buitenzorg, Java. At present we know this species from southern Luzon, north eastern Mindanao and from southern Negros.

3. **Artocarpus nigrescens Elm. n. sp.**

Tall tree, 20 m. high; trunk stocky, 1.5 m. thick, quite burly and with shallow irregular buttresses near the ground; wood moderately hard, yellowish, brittle when chopped, odorless but bitter to taste; bark reddish except the grayish brown surface, comparatively thinly checked longitudinally; the milky juice viscid and coagulates somewhat after being exposed; main branches divaricate, from below the middle of the stem; branchlets rather many, crookedly rebranched; the twigs erect or suberect, marked by ringlike leaf scars, quite rigid. Leaves in ascending crowded terminal tufts, chartaceous, lucid green on the upper side, paler beneath, from 18 to 25 cm. long, at least 1 cm. wide, ovate to oblong in outline, glabrous on both sides, pinnately incised, acute at the base; lobes 3 to 5 pairs, the sinus well parted and rounded, incised two thirds the distance to the midnerve, the middle pair of lobes the longest, the terminal one broadest, the longer ones lanceolate, all acuminately tapering into fine points, margins rugose, segments curvingly conduplicate on the upper surface, veins yellowish green; nerves prominent and brown beneath, the larger one 3 to 5 pairs and terminating into the segments; the secondary lateral nerves strict, oblique, also conspicuous; articulations not very plain; petiole 3 to 5 cm. long, stout, triangular, more of less flattened on the upper surface, puberulous or scurfy, becoming glabrous;

stipules caducous, 1.5 to 2 dm. long, linear oblong or some gradually tapering from the broad base, glabrous, deep brown on the dorsal side, glaucous brown on the ventral, 2.5 to 4 cm. wide near the base. Young female heads subtended by 15 cm. long grabrous yellowish green smooth caducous bracts, greenish within the bud bracts, but soon turning brownish and finally to coal black; perianth of female flower 4 mm. long, the upper 2 mm. not confluent, angular, more or less truncately obovoid, covered with dense hispid excrescences, 1.5 mm. wide near the apex; style glabrous, forked at the throat of the perianth tube; anthocarps linearly clavate, nearly 2 cm. long, united except the 3 mm. long pyramidally conical point which is black and hispid; mature heads coal black, obovoid, 6 to 10 cm. long, 3 cm. wide above the middle, with rather smooth surface and outline; peduncle axillary, 6 to 10 cm. long, stout, terete, glabrous, ultimately becoming recurved, persistent to the syncarpium;

Type specimen 9795, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

Sr. R. Garcia collected at Zamboanga, Mindanao, a larger leaved form with nerves at least pubescent beneath. My specimen number 9097 from Palo, Leyte, may be a staminate specimen of this same species but with leaves the least of all incised. In the type locality it is represented by only a few trees; one in the town limits of Dumaguete near the sea coast, one on the road to Luzuriaga at 600 feet elevation, and the stately tree at 2500 feet from which our specimens were gathered. The branchlets are comparatively numerous, the foliage ample, and the leaves remind one of large incised oak or maple leaves. The black fruits are also plentiful, hanging from the leaf axils and displaying a vivid color contrast to the foliage. Fruits not edible. The wood is classed as very durable. The Visayans call it "Togop" but they also apply the same name to *A. treculiana Elm.*

4. **Artocarpus communis Forst.** Char. Gen. Plant. 102, 1776. *A. incisa Linn. f.* Suppl. Syst. 411, 1781. *A. camansi Blco.* Fl. Filip. ed. 1; 670, 1837. *A. rima Blco.* l. c. 671.

Spreading tree, 15 m. high; wood rather soft and worthless; branches divaricately branched from the middle, the few and

rather slender and thick ultimate ones ascending toward the tips. Leaves ascending, radially spreading, nearly flat or curvingly conduplicate on the upper dark green shining surface, paler beneath, rigid, parchment like, glabrous but occasionally tomentulose beneath and along the veins on the upper surface; blades varying from 3 to 5 dm. wide, 4 to 9 dm. in length, nearly equally acute or obtuse at both ends, oblong to elliptic in outline, the 3 to 5 pairs of lobes equally incised to one fourth the distance to the midrib, the sinus rounded, the terminal lobe larger or at least broader, all of them somewhat oblique to oblongish and terminating into short acute ciliated tips; nerves very prominent beneath, strict, ascending, the 2 basal pairs comparatively small, 8 to 13 pairs, the secondary veins of the larger lateral ones also quite prominent; petiole 4 to 7 cm. long, ultimately glabrous, very stout, with broad oval bases, seminodulous where the blade terminates; stipules in pairs, about 2 cm. long, oblongish, terminating into acute to acuminate points, deep brown and glabrous on the inner side, grayish and covered with strigose hairs on the outer surface, deciduous. Inflorescence axillary, upon pubescent or nearly glabrous recurved peduncles 5 to 9 cm. long; male spike not corrugated, curved or wand like, 2 to 3 dm. long, terete, usually increasing in thickness toward the apex, 2 to 3 cm. in diameter; mature heads globose, up to 2 dm. in diameter, yellowish green; apical free portion of the anthocarps 5 to 8 mm. long, linearly elongated, angular or fluted, hispid, terminated by small callous caps; seeds or nuts many, imbedded, smooth, somewhat irregular in shape or flattened, mostly obovoid, about 2 cm. long.

Represented by 10382, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908

This is the common and widely distributed "Bread-fruit". From the island of Guam is reported a seedless variety, but all our forms are seeded and go under the names of "Antipolo," "Camansi" or "Rima." The meat of the fruit is used only after being cooked or roasted. The nuts are occasionally prepared in the same way for the oil they contain. The young bark or the inner bark of older trees is quite frequently used by the woodsmen as "gee-strings" or groin girdles.

5. **Artocarpus communis blancoi Elm.** n. var.

Fruits 1 dm. long, 7. cm. wide, ellipsoid; anthocarps extended into 1 cm. long spiculate appendages; male inflorescence smooth, cylindric, 5 to 8 cm. long; seeds or nuts ellipsoid, 1 cm. in length.

Type specimen 488, *T. E. Borden*, from the Lamao River, Mount Mariveles, Province of Bataan, Luzon, August, 1904, (Forestry Bureau record 1682).

This is a large tree, with leaf characters of the species, but fruits not edible.

6. **Artocarpus treculiana Elm.** n. sp.

Tree, 12 m. high; wood of stems moderately hard, gnarly, covered with a thick brittle grayish bark; branches rigid, the ultimate ones quite thick and suberect, forming an oblongish crown; twigs glabrous, marked with ring like leaf scars, more or less lenticelled between the scars. Leaves mostly entire, elliptic, similarly obtuse or acute at both ends, margins slightly involute, only occasionally shallowly lobed toward the apex, the average blade 2 by 3 dm., rigidly coriaceous, glabrous and dark lucid green above, much paler and cinereous pubescent beneath; nerves and midnerve bold beneath; the 9 to 13 pairs of lateral ones straight and ascending, the larger ones usually forked towards the apex, the divisions uniting, with faint cross bars; petiole about 5 cm. long, cinereous and becoming glabrous, occasionally provided with a few strigose hairs, thick, triangular; stipule linear, 2 to 3 cm. wide, tapering to an acuminate point, 1 to 2 dm. long, deciduous, glabrous, deep brown on the inner side, grayish brown or cinereous on the exterior, with pubescent tips. Fruits subglobose, quite regular, 7 to 12 cm. in diameter, pendulous from 8 cm. long axillary peduncles, almost isabellinus yellow when mature; male inflorescence upon 2 cm. long peduncles, arising from the leaf axils, cylindric or subclavate, 4 cm. long, 8 mm. thick; anthocarps 2.5 cm. long, united except the 5 mm. long pyramidally conical apex which is glandularly scabrous; nuts smooth, ellipsoid, 12 mm. long, imbedded in the pulpy mass, numerous.

Type specimen 10406, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

Ranges throughout the central region of the Philippine archipelago. Just recently *Eugenio Fenix* collected a form of it on the Batanes islands with pubescent stipules. Its wood is highly prized and is used to make bancas and the gum of it is sometimes used for calking. Fruits not edible. The natives call this the real "Tagop". The northern Visayan and the natives of the Batanes islands apparently eat the fruits and call it "Tipolo" or "Tipugo." Named in honor of *Dr. Trecul* who has done considerable work on this group.

7. **Artocarpus odoratissima Blco.** Fl. Filip. ed. 1; 671, 1837.

Tree, with a spreading crown; branches 3 cm. thick, the younger portions strongly ridged when dry and densely covered with a yellowish brown pubescence. Leaves diverse in size, entire, lobed or incised, elliptic to obovate, the average ones 2 by 4 dm., parchment like, rounded or short acute at apex, base obtuse to cuneate or even subpandurate, soft pubescent with adpressed yellowish brown hairs beneath, less so on the upper which ultimately becomes glabrous; nerves 13 to 17 pairs, very prominent beneath, strict, ascending, cross bars and reticulations also prominent, the larger veins grooved on the upper surface and densely filled with soft similarly colored hairs; petiole thick, ridged or fluted, 1 to 3 cm. long, brown pubescent; stipules 5 to 10 cm. or even more in length, the thin brown margins glabrous even on the exterior, the middle exterior portion densely hairy, deciduous. Staminate inflorescence elongated, obovoid, 3 to 5 cm. long, upon stout 5 cm. long pubescent peduncles: fruits ellipsoid or subglobose, with rather smooth surface, 7 to 10 cm. long, 5 to 8 cm. in diameter, numerously seeded; anthocarps very numerous, slender, 1 to 2 mm. across the subtruncate apex which in the dry state is yellowish brown and scabrid.

Father Blanco secured this species from Mindoro where the natives call it "Loloi", or "Uloy" according to field notes of some more recent collection. He also states that the fruits are edible and possess a very strong sweet odor. It has been collected in central and south western Mindanao and on the island of Basilan.

8. **Artocarpus subrotundifolia Elm.** Leaf. Philip. Bot. 1; 281, 1908.

Large erect tree, 15 m. high; branches spreading, forming a dome shaped crown; the ultimate ones slender, not numerous, horizontally speading, short brown pubescent at the ends. Leaves usually toward the ends of the twigs, few, scattered, unequal in size and shape, submembranous, flat, lucid green above, much duller beneath, quite rigid, usually glabrous above except the yellowish tomentum along the midnerve and lateral nerves, the medium sized blades 3 dm. long, 1.5 dm. wide across the middle, margins subentire or irregularly undulate and involute, apex rounded and terminated by a short acute point or acumen, base rounded or frequently emarginate, the smaller ones orbicular, the normal one broadly oblong or subrotund; petiole about 2 cm. long, when young with a dense rusty brown pubescence; nerves very prominent beneath, brown when dry, 9 to 13 pairs subdivaricate, their tips submarginally interaching, covered with a soft sparse pubescence; cross bars one half as prominent, reticulations quite conspicuous beneath, similarly pubescent. Inflorescence in the leaf axils or in the axils of leaf scars, upon stout very thick densely pubescent peduncles; the pistillate usually in the upper axils, solid, ellipsoid or obovoid, green, 15 mm. long, 12 mm. in diameter above the middle; perianth tubular, narrowed toward the base, 1.5 mm. long, terminated by short, broad, densely ciliate appendages; ovary elongated, flattened, 1 mm. long, glabrous, with a single pendulous ovule; style 0.5 mm. long, glabrous; stigma thicker and darker brown in the dry state, flattened, characteristically recurved, grooved along the upper side, at least 1 mm. in length; male flowers chiefly along the branchlets, pale yellow, spongy, unequal in size and shape, egg shaped or ellipsoid, the average ones 3.5 mm. in diameter, early falling; perianth segments 3, falsely united, 0.75 mm. long, subglabrous or ciliate along the upper margins, the tips closely overarching the stamens; filament very broad at the base, 0.3 mm. long; anther basifixed, 0.2 mm. long, elliptic; between the staminate flowers are erect shield like bracts exceeding the perianth and densely ciliate around the flat rim.

A handsome tree, so far only known from the island of Leyte and from the province of Sorsogon, Luzon. The natives of southern Luzon call it "Lacoan" and use the wood for posts and other structural purposes. Its large subrotund shining leaves are very characteristic.

9. **Artocarpus cumingiana** Tréc. in Ann. Soc. Nat. 3 Ser., 8; 119, 1847. *A. ovata Blco.* Fl. Filip. ed. 1; 666, 1837.

Tree, 15 m. high or higher; wood hard, yellowish beneath the sap wood; branches rigid, forming an elongated rounded dense crown; twigs smooth, reddish brown except the apical young portion which is covered with a dense yellowish brown tomentum. Leaves distichous, membranaceous, oblong, occasionally somewhat elliptic, entire, base short cordate and usually unsymmetric, apex short acute to frequently acuminate, glabrous above except along the sunken midrib especially toward the base, soft pubescent beneath, the average blades 1 dm. long; nerves 13 to 17 pairs, very pronounced beneath, ascendingly curved especially the smaller and more numerous ones at the base, submarginally united, straw yellow or brown; cross bars and connecting reticulations quite prominent beneath; petiole 1 to 2 cm. long, covered with a felt like olivaceous tomentum; stiples 2, subclasping, 4 mm. long. Male heads or inflorescence obovate or pyriform, 2 to 3 cm. long, 15 mm. thick above the middle, no involucre; peduncle several from the axils of the leaves, slender, densely covered with an olivaceous tomentum, 3 to 6 cm. long; flowers scattered among peltate and ciliate bracteoles and with interstices between; perigonium 4-segmented; segments free, in the bud imbricate, concave, obtuse, with pubescent apices; filaments of the stamens equal, bearing terminal short anthers; fruiting head subglobose, rugose, 3 to 5 cm. in diameter, several seeded, covered with a yellowish pericarpium, upon stout 6 to 9 cm. long peduncles.

Type based on *Cuming's* number 1784 collected in the vicinity of Manila. Very common through middle and southern Luzon. It is also found on Mindoro, Masbate and Negros. Typical specimens have much elongated leaves with subequilateral sides, especially so toward the base. It is a valuable timber tree and the Tagalogs call it "Anubiong."

10. **Artocarpus paloensis Elm.** Leaf. Philip. Bot. 1; 280, 1908.

A shrub, 3 m. high; branches hard, with smooth grayish brown bark, the terminal young portion soft and rusty brown pubescent. Leaves alternate, toward the ends of the twigs, 2 to 3 cm. apart, ovately oblong, soft membranous, the average blades 15 cm. long, 9 cm. wide just below the middle, glabrous above except along the grooves of the midnerve and larger lateral ones, apex rounded or obtuse or frequently acute, base broadly rounded, shallowly cordate, green above, much paler beneath, margins subentire or obscurely undulate; petiole 1.5 cm. long, pubescent; nerves 7 to 9 on each side, ascendingly arched, pubescent, reticulations also pubescent and quite prominent beneath. Flowers clustered in the axils of the leaf scars along the two year old twigs, both sexes intermixed, but the male heads more numerous and upon peduncles only one half as long as those bearing the larger female heads; peduncles fleshy, longitudinally ridged in the dry state, densely covered with a very short chocolate brown tomentum, those bearing the female heads 1 to 2 cm. long, spreading; pistillate heads obovoid, 6 mm. long, 5 mm. thick above the middle; perianth more or less united into a 0.75 mm. long tube, its appendages minute and very sparsely ciliate; ovary oblong, 0.5 mm. long, flattened, glabrous, 1-ovuled; style also glabrous, 0.25 mm. long, terminated by a short flattened stigma which barely exceeds the perianth; shield like bracts of the male flowers erect, 0.75 mm. long, their terminal rim not large, glabrous; perianth tubular, 0.6 mm. long, truncate or obscurely lobed, glabrous but with a ciliate rim enclosing a single stamen; filament very thick; bearing a short, comparatively broad anther; fruits not seen.

Very similar to *A. cumingiana Trec.*, but the smaller leaves are not quite as uniformly elongated; the peduncles of the much smaller heads are shorter and mostly arise from the two year old twigs. Type described as a shrub from Palo, Leyte, but if *Copeland's* number 1214 from Todaya, district of Davao, Mindanao, can be referred under this name, it grows to be a tree 15 meters high. *Dr. H. Hallier* also collected it on Basilan, January, 1904. The natives call it "Bagobo-caluit."

11. **Artocarpus leytensis Elm.** Leaf. Philip. Bot. 1; 279, 1908.

A stocky erect tree, 10 m. high or higher, with a bole 3 dm. in diameter; branches widely spreading, forming an umbrella shaped crown, the ultimate twigs rather thin, smooth and grayish brown. Leaves few at the ends of the twigs only, flat, spreading, subcoriaceous, glabrous above except along the midnerve, shining green, much lighter green beneath and short pubescent, oblong, the lower one half occasionally inequilateral and usually narrowed from above the middle, apex obtuse or ocute, the base rounded or only emarginate, the medium sized blades 15 cm. long by 6 cm. wide, the entire magins subinvolute; petioles 1 cm. long, short rusty brown pubescent; nerves 5 to 7 on each side of the midrib, very prominent beneath, ascendingly curved, reticulations also conspicuous. Infrutescence in the leaf axils of the young twigs, subpendulous; peduncles 2 cm. long, fleshy, covered with a short, dense umber colored pubescence, longitudinally ridged when dry, gradually thickened toward the apex, usually solitary; fruits obovoid in general outline, but very irregular in shape, ours 2 cm. across, usually only 1 to 5 sections developing into seeds which are partially imbedded upon the 8 mm. thick fleshy corrugated receptacle; each of these sections bearing from 1 to 5 cells enclosing solitary ovules, its outer walls leathery and covered with a short dark brown tomentum; the seeds surrounded by thin scarious membranes, 8 mm. long, ellipsoid or somewhat flattened, light brown, rugose.

Only known from the type locality, Palo, Leyte, where it is a rather large hardwood tree. Its many yellowish red fruits give the tree a pretty appearance during the month of January.

12. **Artocarpus rubrovenia Warb.** in *Perkin's* Frag. Fl. Philip. 166, 1905.

A strict stocky tree, 8 m. high; branches wiry, smooth, reddish toward the tips, forming an elongated crown. Leaves coriaceous, conduplicate on the upper side especially toward the base, lucid on the upper side, chartaceous, glabrous, paler green beneath, oblong to elliptic, the acute or short cuspidate apex recurved, the base obtuse or rounded and frequently

inequilateral, 18 to 23 cm. long, 7 to 10 cm. wide; nerves reddish and conspicuous beneath, 6 to 10 pairs, ascendingly curved, obscurely connected, reticulations equally distinct on both sides; petiole reddish, glabrous, 2.5 cm. long; stipule 2 mm. long, broadly ovate to acute, sericeous. Inflorescence axillary, obovate, provided with a yellowish brown pubescence, upon 5 mm. long axillary and tomentulose peduncles; staminate heads 1.5 cm. wide, 1 cm. high; pistillate ones subglobose, 1 cm. in diameter; fruits several seeded, yellowish.

Type collected by *Dr. Warburg* at Sampaloc, province of Tayabas, Luzon, and described from his number 12949. It extends through middle Luzon but is more common along the Pacific coast. Sometimes called "Cubi", "Tagop", or "Anubiong".

13. **Artocarpus woodii Merr.** in Philip. Journ. Sci. C. 3; 221, 1908.

Arbor ca. 10 m. alta, glabra; follis anguste oblongo-obovatis, nitidis, 8 ad 15 cm. longis, abrupte late acuminatis, basi cuneatis, integris, nervis utrinque 5 vel 6, prominentibus, anastomosantibus; fructibus, axillaribus, pedunculatis, irregulariter 7-12-lobatis, 6 ad 9 cm. diam., rugosis.

A tree about 10 m. high, glabrous. Branches high-gray, the tips brown and with few adpressed hairs. Leaves narrowly oblong-obovate, glabrous, shining, submembranaceous, entire, 8 to 15 cm. long, 5 to 7 cm. wide, the apex broadly and abruptly acuminate, the acumen retuse, narrowed below to the cuneate base; nerves 5 or 6 on each side of the midrib, prominent beneath, anastomosing near the margins, the reticulations lax; petioles 3 to 5 cm. long, dark colored, pruinose. Fruit peduneled, the peduncles 5 to 7 cm. long, solitary in the upper axils, subglobose, 6 to 9 cm. in diameter, irregularly obscurely lobed, the lobes rounded, rugose, gray, the anthocarps truncate or depressed, 2 to 3 mm. in diameter. Ripe seeds 6 to 12, about 2 cm. long.

Bucas (off the northeast coast of Mindanao), *Merrill* 5259, October 4, 1906.

This very distinct species is found on Bucas and Mindoro islands and from central and northern Luzon. Its shining very coriaceous oblongish obovate leaves and large ligneous

rugose fruits distinguish it at once from all other known Philippine species.

14. **Artocarpus lanceolatus Trec.** in Ann. Soc. Nat. 3 Ser., 8; 121, 1847.

Tree; branches terete, smooth or short hirsute and becoming glabrate; bark black or dark brown. Leaves distichous, petiolate, membranous but rather rigid, oblong to lanceolate, entire, slightly inequilateral, base occasionally subattenuate to rounded or shallowly cordate, apex acuminate, the point obtuse, shining on both sides, 5 to 11 cm. long, 2 to 4 cm. wide; lateral nerves 8 or 9 pairs, prominent beneath, sparsely hairy, more so on the midnerve; petioles adpressed pubescent, 10 to 12 cm. long, caniculate on the upper side; stipule minute, sublateral, acute, triangular, puberulous, 2 to 3 cm. long. Male and female inflorescence oblong, subobovate, narrow, 1.5 cm. long, 6 mm. wide; peduncle 1 to 2 mm. long; flowers mixed with peltate and ciliate bracts; bracteoles of male flowers free from the pedicels and separated by interstices; perianth 3 to 4-segmented; the segments erect, 2-seriate, imbricate, subequal, on the exterior slightly pubescent; anthers narrow, versatile; segments of the female flower united toward the base; ovary ovate; style terminal, simple; stigma spatulate, apical; fruiting heads 1-seeded, 1.5 cm. thick; pericarpium parchment like, ovately depressed, or subcompressed, occasionally with a prominent rib on one side.

Based upon number 60 of *Callery* from Calavan, Laguna province, Luzon. *Dr. Warburg* distinguishes his *A. rubrovenia* from *A. lanceolata Trec.* in its having much larger, glabrous, reddish nerved leaves which have more or less unsymmetric bases; and by the star shaped pistillate inflorescence. Very little known; *T. E. Borden's* number 1145 from mount Mariveles, Bataan province, Luzon, is referred here with some doubt.

15. **Artocarpus nitida Trec.** in Ann. Soc. Nat. 3 Ser., 8; 119, 1847.

Small tree; branches rather numerous, smooth, grayish or the younger twigs reddish. Leaves alternate, chartaceous, subelliptic, mostly acute, often inequilateral toward the rounded or obtuse base, glabrous on both sides, shining above,

entire, 6 cm. long, one half as wide across the middle; nerves 5 to 7 pairs, prominent beneath, puberulent but soon becoming glabrous, intramarginally united, reticulations plain; petiole 5 to 10 mm. long, puberulent; stipule 2, puberulous, 2 to 3 mm. in length. Male inflorescence yellow, oblongish obovoid, 7 to 10 mm. long, 3 to 4 mm. wide, upon 1 mm. long axillary peduncle; flowers scattered among peltate and ciliate bracteoles and with spaces or interstices between them; perigonium 4-segmented; the segments obtuse, concave, imbricate, puberulous; filaments equal, with attenuate apices; anthers narrowed, terminal; female heads subglobose or oblong, 4 by 6 mm. in size; peduncle 1 mm. long, covered with a yellowish brown tomentum; flowers supplied with peltate ciliate bracteoles or perianths; ovary ovate, style terminal and simple, bearing, a spatulate stigma; fruits several seeded.

This species is based upon *Cuming's* number 1078, collected in the vicinity of Manila (probably some distance southward from this place on some of the dry hills). Very little known and aside from the type specimen it has only once been collected by *Mr. Merrill* along a roadside at Maragandang, Cavite province, Luzon. These specimens exactly match, and are not to be confused with *A. xanthocarpa Merr.*

16. **Artocarpus lamosella Blco.** Fl. Filip. ed. 2; 465, 1845.

Small tree; branches wiry, gray or yellowish gray, the younger portion entirely glabrous. Leaves glabrous, alternate, oblong, with elongated or acuminated recurved tips, bases cuneate or rounded, the entire margins subrevolute, coriaceous and shining especially on the upper surface, about 1 dm. long, one half as wide across the middle; petioles 1 to 2 cm. long, glabrous, brown, nerves 7 to 9 main pairs, conspicuous and straw white beneath, the secondary ones and reticulations also conspicuous; stipules very short, acute, cinereous pubescent. Inflorescence ellipsoid to ovoid or obovoid, 5 mm. thick, 1 to 3 from the leaf axils; peduncles cinereous, very short; fruits ovoid to subglobose, irregular, 3 to 5 cm. thick, yellowish red.

It ranges throughout Luzon, from Mindoro to the Batanes islands. The different native names applied to this species

are confusing. *Father Blanco* mentions the Tagalog name "Anabling", and describes it as a large tree whose very durable wood is used as posts for buildings. Leaf specimens are easily placed with the genus *Ficus*.

17. **Artocarpus xanthocarpa Merr.** in Govt. Lab. Publ. 17; 10, 1904.

A tree, 30 m. high or less, with narrowly ovate or ovate-oblong, acuminate, entirely glabrous leaves, and subglobose, more or less irregular, entirely glabrous orange yellow fruit, 3 cm. in diameter or less. Barnches slender, glabrous, light gray. Leaves 8 to 12 cm. long, 3 to 4.5 cm. wide, subcoriaceous, shining, the base slightly rounded or subacute, inequilateral; nerves rather prominent beneath, 8 or 9 pairs, the reticulations lax; petioles glabrous, 1 to 2 cm. long. Flowers unknown. Female receptacles, axillary, the individual apocarps entirely united, the surface of the syncarpium very smooth, when dry somewhat sulcate between the apocarps; seeds obovoid, more or less irregularly compressed, 1 cm. long, 4 to 15 in each receptacle. Peduncle of the receptacle 1 cm. long or less.

The specimens from Lamao River, province of Bataan, Luzon, are from the type locality, but how they can be separated from *Blanco's A. lamosella* is not clear, and *Merrill's* species may prove to be exactly what *Blanco* had in mind. *A. xanthocarpa Merr.* is recognizably distinct from *Trecul's A. nitida* and *A. lanceolata*. Extends throughout Luzon, on Mindoro and on the Batanes islands. The leaves are strikingly similar to some species of *Ficus*. Tagalog "Sulipa."

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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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THE GENUS HYDROCOTYLE

BY

A. D. E. ELMER.

—o—

HYDROCOTYLE Linn.

Creeping postrate herbs, rooting at the nodes. Leaves entire or divided, or cuneate at the base and divided, cordate to hastate or peltate; small stipules scarious, irregularly toothed; petiole usually slender. Umbels smalls, simple or sometimes verticillate below the terminal one, usually substended by small bracts; flowers creamy white or rarely purplish, minute accasionally unisexual; calyx teeth none or minute; petals acute, entire, valvate or imbricate; disk flat, with a cup shaped rim; fruit laterally compressed; the lateral ribs concealed in the commissure, the dorsal one prominent, the secondary ribs usually inconspicuous.

Of the 70 tropical and subtropical species, only 5 occur in the Philippines.

Key to the Philippine species of *Hydrocotyle*.

Petioles and under surface of leaves glabrous; transverse reticulations prominent.

1. *H. asiatica*.

Petioles and under surface of leaves at least strigose; transverse reticulations absent.

Leaves divided into 3 to 5 cuneate lobes.

2. *H. benguetensis.*

Leaves otherwise.

Foliage delicate, not larger than 8 mm. in diameter.

3. *H. delicata.*

Foliage not delicate and larger.

Leaves 6 to 25 mm. in diameter; peduncles and pedicels none.

4. *H. rotundifolia.*

Leaves larger than 20 mm. in diameter; peduncles and pedicels present.

5. *H. javanica.*

1. H. asiatica Linn.

This is very common in the mountainous districts of northern Luzon, sprawling and forming continuous masses over wet ground covered with various species of grasses or in deep ravines along water courses.

From Mindanao to the Batanes islands.

2. H. benguetensis Elm. n. sp.

Matted herbs. Stems glabrous, slender, rooting at the nodes; branches also slender, not numerously rebranched, subtended by thin brown bracts, the ultimate ones strigose; stipules similar to the bracts; petiole very slender, strigose; blade round in outline, 10 to 15 mm. across, primarily parted into 3 cuneate lobes, glabrous above, pubescent beneath; the lobes irregularly toothed or the larger ones 2 to 3-divided. Infrutescence leaf opposed, upon equally slender subglabrous peduncles; flowers not seen; fruiting heads 3 mm. in diameter, about 10-seeded, each seed upon short persistent pedicels which are subtended by persisting brown bracts; seeds flat, 1.3 mm. wide, a trifle less in length, very broadly ovate in outline, apex truncate, base cordate but soon dividing the 2 carpels clear to the apex, smooth; stylopodium flat, circular, style proper oblique or divergent, 0.5 mm. long, terminated by a slightly thickened stigma.

Type specimen 8903, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

This is chiefly found along slow flowing streams or about springs in the grass lands about Baguio. It has also been collected in Formosa. Number 919 *Mrs. Clemens* from central Mindanao is very doubtfully referred here.

Nearest related to *H. tripartita R. Br.*, an Australian species.

3. **H. delicata Elm.** n. sp.

A very delicate densely matted herb. Stems and branches numerous, slender, glabrous, rooting at the nodes, bracts subtending the branches and petioles minute. Leaves solitary from each node, alternate 3 to 7 mm. across, with very obscure crenate teeth and 3 to 5-lobate, glabrous, flaccidly thin, very faintly 3 to 5-nerved from the base. Peduncle 10 to 15 mm. long, suberect, similar to the petiole, leaf opposed; fruiting heads 2 mm. in diameter, globose, about 7 seeded; the very short subpersistent pedicels subtended by minute bracts; seeds 1 mm. wide, 0.75 mm. long, smooth; carpels straight along the commissural ridge, each side with a lateral ridge, only 1 along the dorsal edge; stylopodium very minute; styles proper strongly divergent, extremely short, bearing a minute terminal stigma.

Type specimen 8895, *A. D. E. Elmer*, Buguio, Province of Benguet, Luzon, March, 1907.

Densely and evenly covering rock surfaces along the Sablan river. Only seen once, very rare in our locality. It has also been collected on mount Apo, Mindanao, by *Dr. Copeland*. Number 4352 *Merrill* from Benguet province is a robust form and may prove to be a different species.

4. **H. rotundifolia Roxb.**

Most common throughout the Philippines.

Both the two new Philippine species described above have been confused with this species, but *H. benguetensis Elm.* has no ridges on its fruits; while the larger leaves and more numerously flowered heads distinguish it from *H. delicata Elm.*

5. **H. javanica Thurb.**

It has larger more membranous leaves than the last, and differently marked carpels than the first. So far only known from Mindanao.

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Through an oversight this article was not mailed when published.

EDITOR.

LEAFLETS OF PHILIPPINE BOTANY

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A NEW GREWIA

BY

A. D. E. ELMER.

—o—

Grewia negrosensis Elm. n. sp.

Gnarly tree, 3 to 5 m. high; branches crooked, rigid; the twigs densely yellowish tomentose; wood whitish, moderately hard; bark thick, reddish beneath the blackish brown scaly surface. Leaves ovate to ovately elongated, soft membranous, light green above, whitish tomentose or lepidote beneath, flat with recurved tips, alternatingly scattered, the average ones 12 cm. long, 7 cm. wide below the middle, much smaller toward the distal end of the branchlets, apex abruptly acute or acuminate, base rounded or shallowly cordate and usually inequilateral, margins entire around the base and finely serrate toward the apex; nerves 3 to 5 from the base, ascendingly curved, the 2 to 3 lateral pairs arising above the middle and similarly curved, very prominent beneath, pubescent on the upper side of the blade as well as beneath, the cross bars parallel and quite numerous; petiole exceeding 1 cm. in lenght, gradually thickened, densely tomentose; stipule linearly tapering to a sharp point, 5 to 8 mm. long, tomentose, deciduous. Inflorescence axillary; peduncles 1 to 3, lepidote, ascending, equalling the petioles; pedicels 5 mm. long, similarly pubescent, gradually thickened

toward the distal end where it measures 2 to 3 mm.; thick sepals 5, deciduous, leathery, densely pubescent on the outer side, subspatulate, 6 to 9 mm. long, 2 mm. wide, finely striate, obtuse at both ends, in the bud state united toward the base, ultimately free, brown on the inner side; petals of the same number, deciduous, nearly 5 mm. long, at least 1 mm. wide, yellow, strap-like, the basal one third provided upon the upper side with a finely fringed and suborbicular appendage; stamens indefinite, subpersistent; filaments filiform, glabrous, yellowish, subequal, curved and interlaced, the longer ones 5 mm.; anthers less than 0.5 mm. in diameter, broadly ovate or suborbicular, basifixed, shallowly lobed at the base; ovary densely hairy, ovoid; style mostly glabrous, usually curved, bearing a terminal much flattened disk-like stigma; fruits globose, 6 mm. thick, covered with fine gray hairs, 4-celled, each cell with 1 to 3 seeds; seeds brown, much flattened, triangularly in outline.

Type specimen 10316, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

Variously sized trees scattered in dry soil of hot open grassy slopes at 1200 feet altitude.

This same spècies the writer collected a few years ago in northen Luzon, and was distributed as *G. tiliæfolia Vahl*. In the herbarium, Bureau of Science, are many specimens collected by as many collectors and which have been identified with *Vahls*' species. Through the kindness of the curator of the herbarium, Royal Botanic Garden, Calcutta, I am permitted to have before me typical *G. tiliæfolia Vahl* which has perfectly glabrous twigs and leaves, and the much slenderer peduncles and pedicels are two to three times as long.

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LEAFLETS OF PHILIPPINE BOTANY

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REVISION OF THE PHILIPPINE SPECIES OF ELAEOCARPUS

BY

AUG. DE CANDOLLE

(Geneva, Switzerland).

—o—

The following list of the Philippine species of *Elaeocarpus* is chiefly based upon abundant material kindly placed at the author's disposal by *Mr. A. D. E. Elmer* and *Mr. E. D. Merrill*, as well as upon a fairly complete set of *Cuming's* Philippine plants. All the numbers quoted refer to specimens seen by the author. According to the practice of previous writers on *Elaeocarpus*, the species have arranged in sections. But it must be admitted that two at least of those sections, viz: *Euelaeocarpus* and *Monocera* are rather ill-defined and may eventually be found to merge into each other. It will be noted that at least as many as twelve of the species of *Elaeocarpus* belonging to the Philippines would seem to be endemic, and that only three or four are known to have a wider distribution.

A. Sepals and petals 5, rarely 4.

Sect. I. *Ganitrus* Endl. Ovary and drupe 5-celled, the latter spherical.

1. E. macranthus.

Sect. II. *Euelaeocarpus* King. Ovary 3-celled with 2 or 4 ovules in each cell. Anthers not awned.

Petals shortly laciniate. Leaves covered with minute blisters

2. *E. verruculosus.*

Petals cut about half way down into numerous lacinae.

Anther-valves acuminate.

Young branches pubescent

3. *E. procerus.*

Young branches glabrous

4. *E. philippinensis.*

Anther-valves truncate, rounded or obtuse.

Young branches densely pubescent

5. *E. mindanaensis.*

Young branches glabrous or subglabrous.

Buds velvety, leaves rounded at base

6. *E. fissistipula.*

Buds glabrous. Leaves not rounded at base.

Glands of disk cordiform. Leaves with small projecting glands at top of petiole.

Leaves blistered when dry.

7. *E. floribundus.*

Leaves smooth but for the venation

8. *E. oblongus.*

Glands of disk reniform. No projecting glands at top of petiole

9. *E. cumingii.*

Sect. III. *Monocera* Benth. Ovary 2-celled, rarely 3-celled, with more than 4 ovules in each cell. Outer valve of anther generally produced into an awn (not so, however, in *E. argenteus.*)

Anthers more or less distinctly awned.

Leaves entire, recurved

10. *E. pendulus.*

Leaves more or less serrate or wavy.

Ovary 3-celled

11. *E. multiflorus.*

Ovary 2-celled.

Awn about the length of the anther

12. *E. monocera.*

Awn much shorter than the anther

13. *E. elmeri.*

Anthers not really awned, but with the outer valve pointed and slightly longer than the inner one

14. *E. argenteus.*

B. Sepals and petals 8.

Sect. IV. *Octelaeocarpus* Merrill.

Ovary 2-celled. Anthers distinctly awned

15. *E. octopetalus.*

Imperfectly known species

16. *E. villosiusculus.*

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1. **E. macranthus** Merrill Govt. Lab. Publ. XXXV, 38.

Luzon: province of Benguet (*Elmer* 8891) and Rizal (*Merrill*).

Leyte: (*Elmer* 7127).

2. **E. verruculosus** Aug. DC. sp. nov.

Frutex (?), ramulis teretibus glabris adscendentibus. Folia glaberrima, petiolo tenui ad 18 mm. longo apice paullulo incrassato et minute glanduloso, lamina oblongo- vel lanceolato-acuminata basi cuneata, 8-10 cm. longa, 2.5 cm. lata, margine distanter subserrata, nervis secundariis utrinque sex, subtus prominulis et arcuatim inter se connexis. Racemi breves (2-3 cm. longi) circa 8-flori parce puberuli. Pedicelli 5 mm. longi puberuli, bracteis 5 mm. longis subulatis vel apice inaequaliter tridentatis. Sepala 3.5 mm. longa ovata acuta, extus puberula. Petala subaequilonga, apice 2 mm. lata et ad ⅓ multifida, inde basin versus attenuata, intus parce pilosula et margine ciliata extus glabra. Stamina circiter 20, 2-3 cm. longa antheris oblongis vel ovato-oblongis sub lente glanduloso-papillosis, valvula exteriore paullulo longiore et barbulata. Disci glandulae parvae. Ovarium pubescens triloculare loculis biovulatis, stylo pubescente.

Luzon: Baguio, province of Benguet, in flower in March, 1907, (*Elmer* 8645, 8734).

3. **E. procerus** Aug. DC. sp. nov.

Arbor elatus, ramulis junioribus fulvo-tomentosis. Folia parva, petiolo 5-7 mm. longo tomentoso, lamina ovata, basi rotundata, (5 cm. longa, 2.25 cm. lata), initio pubescente, dein exceptis nervis glabrescente, margine crenato-serrulata, nervo centrali utrinque prominente, secundariis 6-8 subtus prominulis arcuatim adscendentibus. Racemi ad 10 cm. longi, circiter 15-flori, bracteis anguste oblanceolatis 8 mm. longis deciduis. Pedicelli centimetrales. Sepala 6 mm. longa extus pubescentia. Petala ad 7 mm. longa usque ad medium laciniata, basin versus attenuata, intus villosa extus nisi ad marginem glabra. Stamina 25, valvulis apice breviter acuminatis non aristatis, vix barbulatis. Disci grandulae parvae. Ovarium triloculare tomentosum, loculis biovulatis.

Negros: Dumaguete, Cuernos Mts., in flower in May, 1908. Tree 45 meters high in woods at 4000 ft. (*Elmer* 10158).

4. **E. philippinensis** Warb. in Perkins Fragm. Flor. Philip. 101.

Luzon: province of Benguet (*Elmer* 6084) and Albay (*Cuming* s. n.).

5. **E. mindanaensis** Merrill, Philip. Journ. Sci. III, C. 150.

Mindanao: (*Mrs. Clemens*).

6. **E. fissistipula** Miq. Flor. Ind. Bat. I, II, 210.

Luzon: province of Bulacan (*Llanos* in herb. DC). Distrib. Java.

7. **E. floribundus** Bl. Bijdr. 120.

Mindanao: (*Ahern* 403, fide *Perkins* l. c. 100). Distrib. British India, Malaya and Indo-China.

8. **E. oblongus** Gaertn. ex Smith in Rees, Cycl. XII, n. 2.

Luzon: province of Albay (*Cuming*).

Mindanao and Mindoro: (fide *Perkins* l. c.) Distrib. British India, Moluccas and Borneo.

9. **E. cumingii** Turcz. in Bull. Soc. Nat. Mosc. XIX (1846) II, 491,

Luzon: province of Albay (*Cuming* 807).

10. **E. pendulus** Merrill, Govt. Lab. Publ. XXIX, 27.

Luzon: province of Benguet (*Elmer* 5801).

11. **E. multiflorus** Turcz. F. Vill. in Blanco Flor. Filip. ed. III Nov. App. 31.

Luzon: province of Albay (*Cuming* 873); Rizal (*Merrill*), and Tayabas (*Elmer* 10450, 9323).

Mindoro: (*Merrill*).

Negros: (*Elmer* 9552, 10452).

12. **E. monocera** Cav. Icones, VI, 1. t. 501.

Luzon: (Née "in oppido Baños et in fundo Hala-Hala"). I have seen no specimen of this from the Philippines, and doubt whether it is the same as *E. obtusus* Bl.

13. **E. elmeri** Aug. DC. sp. nov.

Frutex ramosus vel arbor, ramis adscendentibus glabris. Folia initio sericea dein glabrata, petiolo 3 cm. longo apice tumescente, lamina chartacea lanceolata longe acuminata margine repando-serrata 10-12 cm. longa 3-4.5 cm. lata, nervis secundariis 6-8 subtus prominentibus, venis reticulatis. Racemi folia subaequantes argenteo-sericei 15-18-flori. Alabastra ovata. Pedicelli 8 mm. longi, bracteis parvis mox deciduis. Sepala lanceolata ad 6 mm. longa extus argenteo-pubescentia. Petala oblonga 6 mm. longa fere usque ad medium fimbriata, 3 mm. lata tam intus quam extus argenteo- adpresseque villosula. Stamina 35-40 sub lente undique brevissime barbulata, arista brevi apiculata. Ovarium subglobosum argenteo-pilosum, disco continuo brevi hirsuto cinctum, loculis 2, 6-8-ovulatis.

Luzon: Baguio, province of Benguet. Flowers in March (*Elmer* 8870, 8967).

14. **E. argenteus** Merrill, Gov. Lab. Publ. XXIX, 26.

Luzon: province of Benguet (*Elmer* 6237, 8596) and Tayabas (*Elmer* 10451, 7422, 7745, 9324).

Mindoro: Mt. Halcon (For. Bur. 4462 *Merritt*).

15. **E. octopetalus** Merrill, Philip. Journ. Sci. III, C. 149.
Mindanao: (*Mrs. Clemens*).

16. **E. villosiusculus** Warburg, in Perkins, l. c. 101.
Luzon: province of Tayabas, (*Warburg*, 13071).

DOUBTFUL SPECIES

E. isotrichus Vill. is the plant described by *Turczaninow* as *Monocera isotricha* in Bull. Soc. Nat. Mosc. XIX (1846) II, 499. But as *Cuming's* No. 836 misquoted by *Turczaninow* is not an *Elaeocarpus* at all, it is just possible that *M. isotricha* may be identical with *E. philippinensis Warb.* which is based on a specimen of the same collector that bears no number.

E. foxworthyi Merrill, Philip. Journ. Sci. III, C. 244.
The flowers of this plant are not known.

E. integrifolius Blanco, Flor. Filip. ed. II, 306.

E. sylvestris Blanco, l. c.
The last two species have no foundation but *Blanco's* unsatisfactory descriptions.

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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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NEW OR LITTLE-KNOWN PHILIPPINE PALMS

BY

O. BECCARI

(*Florence Italy*).

—o—

ARECA (subgen. Balanocarpus) Ipot Becc. *A. Cathecu humilis* Blanco, Flora de Filipinas ed. 2. (1845) p. 495.

Mediocris, ad summun 4 m. alta, caudice 7-12cm. diam. Frondium segmenta numerosa, aequidistantia, elongato-lanceolata, plicato-2-4-costulata, acuminata, leviter falcata; 2 terminalia latiora ac breviora, spice truncata et duplicato-inciso-dentata. Spadicis indivisi pars florigena cylindracea, circite 14 cm. longa, 6 cm. spissa, parte peduncolari crassa, 6-10 cm. longa, 2 cm. lata, suffulta; floribus circum axin densissime insertis, latissime ovato-conicis. 12-14 mm. ad basin latis, quisque in ramo valde abbreviato partem padicellarem brevissimam simulanti sessilibus, ramis utrinque ramulum gracilem, 12-13 cm. longum, floribus masculis onustum ferentibus. Fructus circum axin addensati, majusculi, 5 cm. longi, 3 cm. crassi, ovoidei, basi mutua pressione plus minus angulosi, in vertice rotundati; semime plus minus globoso, basi leviter applanato, extus crebre reticulato.

A small tree 4 m. high or at times much less. *Stem* 7-12 cm. in diam., strongly marked by annular rings, 7-12 cm. apart. *Leaf-sheaths* about 60 cm. long. *Leaves* 1.5 m. long, without any appreciable petiolar part. Leaflets numerous, equidistant, inserted at a rather acute angle, and very close set, herbaceous, glabrous, concolorous on both surfaces, those near the base and in the middle are elongate, lanceolate, plicate-2-4 costulate, acuminate, slightly falcate, 50-60 cm. long and more; varying in breadth from 3 to 5 cm. according to the number of their costae: the two summit leaflets are broader and shorter than the others, pluricostulate, truncate at tip, where they are slightly toothed, the teeth being again cleft, and the divisions acuminate. *Spadix:* simple, cylindrical at the flower-bearing part; this latter is borne on a peduncle 6—10 cm. in length, somewhat flattened, and about 2 cm. broad, with the *female flowers* very densely arranged in spirals round the axis, each flower borne upon a kind of pedicel, very short and thick, which is really a shortened branch of the axis, and extends to right and left into a slender and long branchlet, which bears the male flowers; the part carrying the female flowers is, during anthesis, 14 cm. long (in one specimen it was 6 cm. thick); the branchlets bearing the male flowers are 12-17 cm. long, 2 mm. thick at the base (or slightly more), subulate at the summit, straight, angular, closely and alternately notched. *Male flowers* stand in pairs on the lower two thirds of the branchlets, above they are solitary, very minutely bracteolate, lanceolate, very acute, asymmetric and curved or falcate, 5 mm. long; the calyx is very small, the sepals are lanceolate; the corolla is many times as long as the calyx; stamens 6; rudimentary pistil subulate, about as long as the stamens. *Female flowers* very broadly ovoid-conical, 12-14 mm. broad at the base; the sepals very broad acute; the corolla protrudes beyond the calyx only by the triangular and dry point of its petals, which otherwise are very similar to the sepals. Ovary ovoid conical, acute; the stigmas thickish, subulate, projecting between the petals when the male flowers are still attached to their branchlets; staminodia very small, linear. *Fruit* ovoid, about 5 cm. long, and 3 cm. or a little more broad, very similar to those of *Areca Catechu*, sessile or very closely clustered round the axis and often rendered more or less angular at

their bases by mutual pressure; the remains of the stigmas from a small tubercle on the rounded summit; the mesocarp at length is disassociated in very slender and soft filaments. *Seed* globular with a slightly flattened base and a rounded top, otherwise similar to that of *A. Catechu;* the vascular branches of the raphe greatly anastomosing, and forming a net all round it. *Fruiting perianth* with split and much lacerated divisions.

Probably indigenous in the Philippines. I first received a fruiting specimen of this very fine *Areca* collected by *Mr. Elmer*, in May, 1907, at Lucban, Tayabas Province, Luzon (No. 9292); afterwards Mr. Merrill sent me another specimen of this same species, having a spadix in flower, collected by *Curran* at Sampaloc, also in the province of Tayabas. Mr. Merrill informs me that the plant is rather common in the towns in the vicinity of Mount Banajao, and that it is quite different in habit from the ordinary *A. Catechu*, being charaterized not only by its dense inflorescence, but also by its small size, as the bunches of fruit can easily be reached by one standing on the ground; Blanco says the same of his *Areca Cathecu humilis.* Native name "Bunga Ipot."

Areca Ipot, though very similar to *A. Catechu* in the fruit, belongs to a quite distinct division of the genus (*Balanocarpus*) which has the flowers and fruits densely clustered round an undivided central axis, one which has only representatives in the Moluccas (*A. glandiformis*) and in the Papuan region (*A. macrocalyx* and allied forms). It is, however, distinguished from all these by its much larger ovoid fruits.

I have added to *A. Ipot* the synonym of Blanco, *Areca Cathecu humilis*, on the suggestion of Mr. Merrill, who considers the identification as quite certain. There are however, some true varieties of *A. Catechu* with shorter stems than usual, which would well deserve the name of "humilis" in respect of the type; while to *A. Ipot* that adjective cannot be applied in an absolute sense, because some of the already known Arecas are less than 1 m. high, having stems not thicker than a man's little finger.

Blanco writes that his *A. Cathecu humilis* occurs on the Mountains Balanga in the Province of Laguna, and that it always remains a dwarf tree in whatever way it is cultivated.

The following is Elmer's field-note to his No. 9292: "Small erect trees 4 metres, or much less high, in small palm groves at 750 metres; leaves 3 to 5, as many feet long, gracefully recurved; midrib green, rigid; leaflets ascending, strongly ridged and grooved; stems 3 to 5 inches thick; rings 3 to 5 inches apart; sheath 2 feet long, smooth, green, swollen near the base; stalk of fruit cluster 3 to 6 inches long, flattened, strongly recurved; fruits sessile, densely clustered, deep orange red, smooth, irregular in shape, more or less angular at the base. The natives call it "Bunga Ipot" while the regular "Betel-nut Palm" they simply call "Bunga". The nut of the former is also used by the natives but it is not considered as good as the latter. It is planted mostly for ornamental purposes and makes a pretty appearance".

Pinanga negrosensis Becc. sp. nov.

Caespitosa, caudice subelato circ. 7 cm. diam. Folia 1.5-2 m. longa, petiolo brevi triangulari; vagina 50-60 cm. longa; segmentis numerosis aequidistantibus, spisse chartaceis, rigidis, rectis, prope apicem tantum leviter falcatis, apice acuminato-caudatis, vulgo unicostatis et ensiformibus, circ. 40 cm. longis et 14-16 cm. latis, etiam latioribus et bicostulatis ac anguste lanceolatis, utrinque viridibus et opacis, marginibus conspicue incrassatis. Spadix fructifer refractus, circ. 25 cm. longus, breviter pedicellatus, ramis nonnihil numerosis spiraliter insertis, crassiusculis, basi subtrigonis, superne compressis; floribus inferne 3-seriatis et in dimidiam superiorem ramulorum partem biseriatis; fructibus parvis, anguste ellipticis, utrinque attenuatis et acutis, apice mammillatis, 12-13 mm. longis, 6 mm. latis; semine elliptico, 9 mm. longo, 5 mm. lato, apice rotundato et vix apiculato, basi brevissime caudiculato et pungenti. Perianthium fructiferum depresse cupulari, 4 mm. latum et vix 2 mm. altum, truncatum, in ore leviter coarctatum.

A rather large tree. The stem is about 8 m. high and 7 cm. in diam. *Leaves* 1.5-2 m. long with a short and stout triangular petiole; leaf sheaths 45-60 cm. long; the rhachis is covered, at first, with a fine dark scurf, and, after this has disappeared, is finely dotted under the lens. Leaflets numerous, thickly papyraceous, very rigid, straight throughout, but slightly falcate near the apex, equidistant, 15-18 mm. apart at the

base, gradually acuminate to a long tail-like point, somewhat narrowing also towards the base which is rather narrow and where the margins are bent backwards, usually they are unicostate and ensiform, about 40 cm. long and 14-16 mm. broad, but sometimes they are bicostate and in this case they are about twice as large and narrowly lanceolate, green and dull on both surfaces, narrowly, but very distinctly bordered by a rather thick nerve, especially on the lower surface; the mid-costa is acute above, beneath it is very slender and furnished with a few linear scarious scales; secondary nerves slender, tertiary nerves scarcely visible, being immersed in the perenchyma. *Fruiting spadix* recurved, apparently about 25 cm. long, divided into rather numerous branches, which are irregularly and spirally inserted round the axis; the peduncular part of the spadix in short; the branches are rigid, thickish, subtrigonous in their inferior part, where the flowers are arranged in 3 longitudinal series, flattened in the remainder, where the flowers are biseriate: they are throughout of the uniform thickness of 3.5-4 mm. *Fruits* 4-5 mm. apart in each line, small, narrowly elliptical, diminishing equally to both ends; their bases acute; their apices mammilate and 12-13 mm. long, 6 mm. broad; the bract subtending the fruit very short, with a rounded margin; the side bracts are very narrow and inconspicuous. *Seed* elliptical, 9 mm. long, 5 mm. broad, rounded above where it is very inconspicuously apiculate, very briefly caudiculate, and pungent at the base, the branches of the raphe very slightly and loosely anastomosing; albumen radiately ruminated, when seen in a cross section, by 12-14 lamellae penetrating almost to the centre. *Fruiting perianth* shallowly cupular, 4 mm. broad and not quite 2 mm. high, truncate and slightly contracted at the mouth.

Type specimen 10030, *Mr. A. D. E. Elmer*, Dumaguete (Cuernos Mts) Province of Negros Oriental, Island of Negros, May, 1908.

P. negrosensis is related to *P. rigida*, but is distinguished by the narrower, slightly falcate and more distant leaflets; by the spadix having more numerous branches, and these more slender, not trigonous throughout, but distinctly flattened from the middle upwards; by the flowers being 3-seriate in the lower

part of the branchlets and biseriate in the remainder. The fruit is also narrower, and the fruiting perianth less depressed than in *P. rigida;* finally the seed is pungent at its base, while it is blunt in *P. rigida.*

The following is Elmer's field note to his No. 10030:

"Stems grow in small clusters in damp ravines at 3000 feet; trunk pale whitish, smooth, 3 inches thick and 25 feet high, gray towards the ground, green towards the top, conspicuously ringed every 1 to 3 inches; leaves rather dense, 1.5 to 2 m. long; the stout triangular rachis recurved, .75 inches wide at the base; pinnae ascending, rigid, dull green, with a pair of yellowish nerves along the upper side; sheath 1.5 to 2 feet long, hard, green or glaucous green, smooth, about 6 inches thick. Fruiting spadix drooping from the uppermost axils of the fallen leaf scars, green; fruits yellowish red, becoming bright red, and when fully ripe nearly velvety black."

Pinanga rigida Becc. sp. nov.

Mediocris 3-5 m. alta, caudice solitario, 7-8 cm. diam. Folia rigida, petiolo nullo, segmentis numerosis aequidistantibus, inter se valde approximatis et fere imbricatis, spisse chartaceis, rigidis, rectis minine falcatis, ensiformibus, unicostatis, a medio in acumen rigidum sensim attenuatis, intermediis 45 cm. longis, 2 cm. latis. Spadix fructifer refractus, circiter 25 cm. longus, breviter pedicellatus; ramis nonnihil numerosis, spiraliter insertis, crassiusculis, 18-20 cm. longis, basi 4 mm. spissis, apice paullo attenuatis, usque ad apicem flores triseriatim ferentibus et trigonis; fructibus parvis, ovato-ellipticis utrinque parum attenuatis et acutiusculis, apice mammillatis, 13-15 cm. longis, 6-7 mm. latis; somine ovato, utrique aequaliter rotundato, 8 mm. longo, 6 mm. lato, fovea embryonali leviter obliqua. Perianthium fructiferum brevissime cupulari, 4.5-5 mm. latum, 1.5 mm. altum truncatum, in ore leviter coarctatum.

A small tree 3-5 m. high with a solitary stem 7-8 cm. in diameter, having the internodes 8-12 cm. long. *Leaves* dark green, very stiff, with numerous leaflets, which are so closely set (only 10-12 cm. apart) as to almost imbricate, the upper margin of one overlapping the lower of that immediately above; leaf-sheaths about 45 cm. long; petiole quite obsolete.

Leaflets thickly papyraceous, very rigid, quite straight, unicostate, dull, and concolorous on both surfaces, ensiform, and from the middle upwards gradually acuminate to a rigid point, narrowing shortly to the base which is rather narrow; the mid-costa is very acute; the upper secondary and tertiary nerves are slender but prominent, so as to give a finely striate appearance to both surfaces, but especially to the lower one; the leaflets which I have seen apparently belong to the upper third of the entire leaf, they are 45 cm. long and 2 cm. broad. *Spadix*, when there is fruit, recurved, 25 cm. long, divided into several branches which are irregularly and spirally inserted round the axis; its peduncular part is short; the branches are rigid, thickish, 4 mm. broad at the base, slightly narrowing upwards, 18-20 cm. long, trigonous throughout, all the flowers being arranged in three longitudinal series. *Fruits* 5-7 mm. apart in each series, small, ovoid-elliptical, somewhat and equally narrowing to both rather acute ends, their apices mammillate, 13-15 mm. long, 6-7 mm. broad. *Seed* ovoid, equally rounded at both ends, 8 mm. long, 6 mm. broad, its base blunt and with the embryonal fovea slightly oblique; the branches of the raphe are usually only 5, simple or very slightly anastomosing, ascending, the central branch passing over the top, and the others curved at the side of the seed. Albumen deeply ruminated. *Fruiting perianth* very shallowly cupular, 4-5 mm. broad and 1-5 mm. high, truncate and slightly contracted at the month.

Type specimen 10187 *A. D. E. Elmer*, Dumaguete, Cuernos Mountains Province of Negros Oriental, Island of Negros, May, 1908. In mossy woods at 2000 m.

It is closely related to *P. woodiana* Becc., but this has bicostulate leaflets. It approaches also *P. sclerophylla* and *P. negrosensis*, and forms with these a small group of allied forms which have the spadices spirally arranged round the axis and with 3-seriate flowers and trigonous branches.

Mr. Elmer in his field-notes writes of this palm: "Erect tree 3 to 5 m. high; stems smooth, brown, 3 inches thick, the flat and rather broad rings of a similar color, 3 to 5 inches apart, quite evident throughout the length of the stem; leaves dark green, quite stiff, pinnate clear to the base; sheath solid,

green, 1.5 foot long; paniculate fruit-spadix recurved, 10 inches in length; nuts velvety, deep red when mature, mostly in 3 rows; wood fibres whitish, the outside hard, the central portion pithy."

Heterospathe elmeri Becc. sp. nov.

Slender, 15 metres high, *Leaves* about 1 m. long in the pinniferous part; petiole about 60 cm. long; leaflets numerous, equidistant, thick papyraceous or subcoriaceous, dull green on both surfaces, but paler beneath; ensiform, the medials about 60 cm. long, 27 mm. broad, very gradually acuminate to a long narrow, almost straight, or only very slightly falcate point, and very rapidly contracted, and backwardly plicate at the base; unicostate; the costa almost equally prominent on both surfaces, and having 3 distinct secondary nerves on each side of it; tertiary nerves numerous, very slender, visible only on the under surfaces; transverse vein obsolete; both margins conspicuously thickened by a marginal nerve. *Spadices* axillary or interfrondal, 1 m. long, or rather less, forming a somewhat loose twice branched panicle, the peduncular part being about 45 cm. long, 35 mm. wide, and 12 mm. thick; ultimate or flower-bearing branchlets are rather thick, 3 mm. in diam. *Flowers* very closely and spirally set, scarcely leaving any portion of the axial parts of the branchlets exposed. *Fruit* small, slightly asymmetrical, elongate-ovoid, narrowing considerably into a slightly oblique, obtuse, rather thick apex, 12 mm. long, 6 mm. in diam., obscurely and very closely striolate externally (when dry) by the closely packed, elongated sclerosomes of the thin almost dry mesocarp; endocarp very thinly membranous. *Seed* attached laterally for its whole length, oblong, terete, 10 mm. long, 5 mm. in diam, obtuse at both ends; the ramifications of the raphe form a net all round it; albumen deeply, radiately ruminate; embryo exactly basal. *Fruiting perianth* cupular, 5 mm. high, 4 mm. broad; sepals orbicular, entire; both sepals and petals subshining, finely obsoletely striate; petals twice as long as the sepals, very broad, semicircular, entire, very shortly and obtusely apiculate. *Fruits* horizontally inserted, subtended by a short broad, rounded (not apiculate) basal bractea; the lateral bracts forming a distinct and complete though shallow cup.

Type specimen 9559, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Island of Negros, March, 1908. In deep damp ravines, at about 1000 m. elevation.

Distinguished from the other few species of this genus, by its elongate-ovoid, oblique tipped fruits, which are subtended by a distinct and complete cupula, formed by its 2 special bracts; the fruits are set so close together that they almost entirely conceal the axis of the branchlets.

The following is Elmer's field-note to his No. 9559: "Slender tree 15 metres high, in steep damp ravines at 3000 feet; leaves without a prominent sheath bole, but having the base of the 2 feet long petiole much broadened and clasping the stem at the base; the leaflet bearing portion about 1 m. long; leaflets descending, duller green beneath, tough; inflorescences from the lower leaf axils, 1 m. long or less; the peduncle 1.5 inch wide, .5 inch thick, about 1.5 feet long, hanging, abruptly divided into a numerously branched equally long panicle (the main branches again paniculately branched), smooth and green, as are also the ultimate branches which are rather lax; calyx cup ultimately brown; fruits green, yellowish, and finally red; wood hard on the exterior with rigid black fibres; bark smooth, also hard, conspicuously grayish white; stems ringed towards the top every 2 to 3 inches, about 7 inches in diameter toward the base; associated with number 9558, "Belisan". Leaf-buds edible".

Livistona rotundifolia Mart.

This palm, which is common in Celebes, was not till now recorded as belonging to the Philippine Flora, where it now apparently grows in a wild condition even if originally of foreign origin. To it belongs *Elmer's* No. 9293 collected in flower at Lucban, Province of Tayabas, Luzon, and *Curran's* No. 5834 (Forestry Bureau) with fruits from the Province of Zambales, Luzon. It is said to be a very useful palm (Elmer) and is used by Negritos for bows (Curran).

Calamus elmerianus Becc. sp. nov.

Scandent, sheathed stem about 18 mm. in diam. *Leaf-sheaths* dark green, densely set with short pale green spines

(Elmer). *Leaves* cirriferous, apparently about 1 m. long in the pinniferous part, with few inequidistant remotely grouped leaflets; petiole almost obsolete; rachis armed beneath towards its upper end with (usually) solitary claws along the middle, and several others much smaller at the sides, all having a light colored base and a black tip; on the upper surface the rachis is bifaced with the salient angle spinulous in its lower portion; the terminal cirrus is slender and very densely armed with small, scattered, and very sharp claws; leaflets geminate or in pairs on each side of the rachis, the pairs of one side opposite to those of the other side, altogether forming 3-4 remote groups; in each of these the leaflets are 15-20 mm. apart at their bases; they are papery, rigidulous, dark green above, very slightly lighter beneath concavo-convex, oblong-oblanceolate, 15-25 cm. long, 4-6.5 broad, the basal pair being much the smallest, usually broadest above their middle and thence gradually narrowing towards an acute base; near the summit they are more or less contracted into a point more or less elongate, triangular, and acuminate; they have usually 5 slender costae which are smooth on both surfaces; transverse veinlets extremely numerous and approximate, very slender but very sharp on both surfaces; margins very remotely and inconspicuously spinulous, except at the apex, where the spinules are closer and larger. *Male spadix*......... *Female spadix* elongate (about 2 m. long—Elmer) extended into a slender tip with only 2-4 remote partial inflorescences; primary spathes elongate, tubular, cylindraceous, rather closely sheathing, finely striate longitudinally, thinly coriaceous, green, narrowing a good deal in their lower portion to a very slender axial part, rather densely armed with small scattered prickles, obliquely truncate at the mouth, and prolonged at one side into a triangular acuminate point; partial inflorescences inserted near the mouth of their respective spathes, arched-scorpioid, small (about 10 cm. long in one specimen) with 2 series of (each series consisting of 6-7) slightly assurgent spiklets; secondary spathes tubular-infundibuliform, rather closely sheathing, horizontally truncate, entire and smooth at the mouth; spikelets inserted at, or a little above, the mouth of their respective spathes; spikelets small, slender; the lowest being the largest, 2.5-3 cm. long, with 10-11 flowers on each side, the others shortening gradually and with fewer flowers; spathes suddenly

broadening into an open infundibuliform limb, glabrous, obscurely produced at one side into an obtuse point; involucrophorum not pedicelliform, but a very short neck, this suddenly expands into a narrow obicular limb; involucre explanate, the orbicular scar left by the fallen flowers or fruits is bordered by a narrow circular entire limb. The areola of the neuter flower is represented by a small tubercle. *Female flowers* very small, 2 mm. long. *Fruiting perianth* short but distinctly pedicelliform. *Fruit* globose-ovoid, very suddenly and distinctly surmounted by an obtuse cylindraceous beak, about 13 mm. long including the beak and the perianth, and 9 mm. broad; scales very small, in 21 longitudinal series, squarrose, flattish, not channelled along the middle, of a dirty straw color with lighter margins and with a reddish-brown, erosely toothed point. *Seed* globular-ovoid, 7 mm. long, compressed, coarsely pitted, with a central, orbicular, rather deep chalazal fovea on the raphal side.

Type specimen 9298, *A. D. E. Elmer*, Lucban, Province of Tayabas, May, 1907. In dry woods at 800 m.

Closely related to *C. mitis* Becc. of the Babuyanes Islands, from which it differs in the leaflets being very distinctly geminate (not single) on each side of the rachis. Both *C. elmerianus* and *C. mitis*, approach *C. minahassae* from Celebes.

Calamus discolor Mart. Hist. nat. Palm. 111, p. 212 (edit 1ª) et p. 341; Becc. Asiat. Palms in Ann. Bot. Gard. Calc. XI, pl. 228; *C. lindenii* Rodigas in Illustr. Hort. XXX (1883) p. 157 *t. 449;* Ridley in Journ. Str. Branch R. As. Soc. No. 44, (1905) p. 200.

This species, known in cultivation and said to be indigenous in the Philippines, had never been found by recent botanists in a wild condition, until Mr. Elmer collected it with young fruits (No. 9299) in Luzon, at Lucban, Province of Tayabas. *C. discolor* was originally described by Martius but from leaves only and till lately no other organ of the plant was known; but its leaves are so peculiar that I easily recognised in them *C. lindenii* of horticulturists, of which a female plant flowered in the year 1902 in the Botanical Garden at Singapore. Of this plant a dried specimen was kindly sent to me by Mr. H. N. Ridley. This specimen exactly agrees with those distributed by Elmer under No. 9299.

C. discolor is apparently related to the species of group V. of my Monograph, and must be placed in proximity to *C. tonkinensis* and allied species, though rendered quite distinct from any other by several characteristic features which are not very frequently met with in other species, especially by the female flowers spirally arranged all round the rachis of the spikelets and not bifarious; moreover I do not know of any other species of Group V (with noncirriferous leaves and flagelliferous leaf-seaths) having the leaflets green above and so distinctly covered on the under surface with a white chalky coating.

The following is Elmer's field note on No. 9299: "Scandent climbers in jungles along stream gulches at 650 metres: stems .5 inch thick, smooth, green, with rings 3 to 5 inches apart, wiry; upper portion of stem clothed with persistent sheaths densely beset with thin, very slender, brown spines; leaves 3 to 5 feet long, leaflet bearing for the upper two thirds; leaflets dark and shining, green above, glaucous beneath, very thin; flagella alternating with the leaves, and twice the length of the foliage."

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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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MUSCI NOVI PHILIPPINENSES I.

BY

V. F. BROTHERUS

(*Helsingsfors, Finland.*)

—o—

DICRANACEÆ

1. **Campylopus (Atrichi) calodictyon** Broth. n. sp.

Dioicus; gracilis, caespitosus, caespitibus densiusculis, sordide vel lutescenti-viridibus, haud nitidis; *caulis* ad 3 cm. usque altus, erectus, strictus, rubro-tomentosus, laxiuscule, superne densius foliosus, simplex, in planta fertili apice innovationibus nonnullis brevibus erectis; *folia* sicca adpressa, humida erecto-patentia, canaliculato-concava, e basi lata ovali subsensim lanceolato-subulata, usque ad 5 mm. longa, basi usque ad 0.8 mm. lata, marginibus erectis, apice remote denticulatis, nervo basi c. quartam partem folii latitudinis occupante, plus minusve longe excedente, dorso laevi, cellulis subalae rhombeis vel rhomboideis, chlorophyllosis, basilaribus laxis, oblongo-hexagonis, teneris, inanibus, in laminam alte productis, marginalibus ad basin multo angustioribus, dein

minutis subquadratis, alaribus fusciduliscaeterum parum distinctis; *sporogonia* 3–6; *seta* cygnea, c. 6 mm. alta, lutea, partim nigrescens, apice tuberculosa; *theca* inclinata, asymmetrica, ovalis, profunde sulcata, collo crasso, tuberculoso; *operculum* e basi conica oblique rostratum; *calyptra* cucullata, ad medium thecae producta, fimbriata.

Type specimen 9745 *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, April, 1908.

Species distinctissima, habitu *C. comoso* (Hornsch. et Reinw.) Bryol. jav. similis, sed foliorum areolatione, seta apice tuberculosa et theca collo tuberculoso diversissima.

FISSIDENTACEÆ

2. **Fissidens (Semilimbidium) Elmeri** Broth. n. sp.

Autoicus; gracilis, caespitosus, caespitibus laxiusculis, laete viridibus, haud nitidis; *caulis* vix ultra 5 mm. altus, cum foliis c. 1.9 mm. latus, basi fusco-radiculosus, dense foliosus, simplex vel subsimplex; *folia* c. 10-juga, erecto-patentia, sicca homomallula, inferiora minora, superiora lineari-lanceolata, breviter et anguste acuminata, acutissima, ob papillas prominentes crenulata, lamina vera lamina apicali subaequilonga, hyalino-limbata, lamina dorsali ad basin nervi enata ibidemque rotundata, elimbata, nervo hyalino, continuo vel brevissime excedente, cellulis minutissimis, c. 0.005 mm., rotundato-hexagonis, elevato-papillosis; *seta* terminalis, adscendens, 2 mm. alta, tenius, lutea, laevissima; *theca* inclinata, obovato-oblonga, deoperculata oblonga, pallida; *operculum* e basi conica breviter oblique rostratum. *Calyptra* ignota.

Type specimen 10320 *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Occidental, Negros, June, 1908. Ad ligna putrida.

Species *F. asperifolio* Broth. et Fleisch. affinis sed inflorescentia, statura robustiore foliisque anguste acuminatis dignoscenda.

CALYMPERACEÆ

3. **Syrrhopodon (Eusyrrhopodon-Tristichi) macro-tristichus** Broth. n. sp.

Dioicus; robustus, caespitosus, caespitibus laxis, lutescentibus, haud nitidis; *caulis* ad 10 cm. usque longus, adscendens, parce radiculosus, laxe foliosus, dichotome ramosus vel simplex; *folia* tristicha, e basi vaginante, albicante, aequilata in laminam horride patulam linearem, lanceolato-acuminatam, usque ad 12 mm. longam producta, limbata, limbo incrassato, luteo, in parte media laminae minute, in parte superiore simpliciter vel geminatim spinoso-denticulato, nervo crassiusculo, infra summum apicem folii evanido, ibidemque dorso denticulato, cellulis laminalibus minutis, incrassatis, rotundato-quadratis, minute papillosis, basilaribus internis laxis, hyalinis, teneris, plerumque rhomboideis. Caetera ignota.

Type specimen 7713, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907, alt. 1800 m.

Species *S. tristicho* Nees valde affinis, sed statura robusta oculo nudo jam dignoscenda.

WEBERACEÆ

4. **Webera integerrima** Broth. n. sp.

Dioica? gregaria vel connato-caespitulosa, obscure viridis, aetate fus ca; *caules* brevissimi, basi adscendente valde radiculosa inter se cohearentes, dense foliosi, simplices; *folia* plus minusve patentia, sicca erectiora, e basi ovali, pellucida spathulato-oblonga, obtusa, mucronata 5-6 mm. longa et usque ad 1.2 mm. lata, marginibus erectis, integerrimis, nervo valido, superne multo angustiore, ad basin mucronis evanido, cellulis laminalibus minutissimis, subrotundis, valde chlorophyllosis, laevissimis, basilaribus oblongo-hexagonis, teneris hyalinis; *bracteae perichaetii* siccitate imbricato-homomallae, externae lanceolato-subulatae, nervo excedente longe aristatae, cellulis superioribus chlorophyllosis, internae hyalinae, intimae retusae, angulis acutis, integris, nervo longissime excedente. *Theca* et *peristomium* ut in *W. murcronifolia.*

Type specimen 10242, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908.

Species *W. mucronifoliae* (Mitt.) C. Müll. et *W. involutae* (Mitt) C. Müll. affinis, ab hac caule breviore foliisque brevius mucronatis, ab illa bracteis perichaetii internis haud laciniatis jam dignoscenda.

5. **Webera Elmeri** Broth. n. sp.

Dioica? caespitosa, caespitibus laxiusculis, obscure viridibus, aetate fuscis; *caulis* brevis, vix ultra 5 mm. altus, basi radiculosus, dense foliosus, simplex; *folia* patentia, sicca erectiora, e basi ovali, pellucida elongate spathulato-ligulata acutiuscula, usque ad 9 mm. longa et c. 0.9 mm. lata, marginibus erectis, in parte ligulata sinuato-denticulatis, nervo valido, infra summum apicem folii evanido, cellulis laminalibus minutissimis, subrotundis, valde chlorophyllosis, laevissimis, basilaribus oblongo-hexagonis, teneris, hyalinis; *bracteae perichaetii* erectae, haud homomallae, externae lanceolato-acuminatae, nervo excedente longe aristatae, cellulis superioribus chlorophyllosis, internae hyalinae, intimae retusae, angulis acutis, integris nervo longissime excedente; *theca* vetusta perfecte immersa. Caetera ignota.

Type specimen 10057, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

Species *W. rupestri* (Mitt.) C. Müll, et *W. longifoliae* (Griff.) C. Müll, affinis, ab hac bracteisque foliis haud mucronatis perichaetii internis haud laciniato-retusis, ab illa theca immersa dignoscenda.

NECKERACEÆ

6 **Symphysodontella (Pseudo-Pterobryum) subulata** Broth. n. sp.

Dioica; gracilis, pallide viridis, aetate fuscidula, nitidiuscula; *caules secundarii* remoti, 3-10 cm. longi, inferne simplices, squamis remote dispositis, saepissime destructis, dein laxiuscule foliosi, rarius flagelliformiter producti, irregulariter pinnatim ramosi, ramis erecto-patentibus, laxiuscule foliosis, simplicibus vel parce ramulosis, interdum flagelliformiter attenuatis; *folia* patentia, subconvolutaceo-concava, ovato-oblonga, plus minusve raptim loriformi-subulata, marginibus integris, in subula distincta denticulatis, nervo distinctissimo, fere ad basin subulae producto, cellulis anguste linearibus, basilaribus, infimis abbreviatis, inter se porosis, fuscis, alaribus nullis, omnibus laevissimis; *bracteae perichaetii* internae erectae, elongate oblongae, sensim longissime lanceolato-subulatae, in-

egrae vel subintegrae, nervo elongato, cellulis angustissimis, basi laxis, teneris; *seta* brevissima, vix ultra 0.6 mm. alta; *theca* immersa, erecta, oblongo-ovalis; *exostomii* dentes longe infra orificium thecae oriundi, c. 0.5 mm. longi, lanceolato-subulati, lutescentes, linea media exarati, laevissimi; *endostomium* imperfectum; *spori* 0.015-0.020 mm., fusci, papillosi; *operculum* conicum, obliquulum, breviter rostratum; *calyptra* mitraeformis, pluriloba, operculum tantum obtegens, nuda.

Type specimen 9974, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, May, 1908.

Species distinctissima, *S. convolutae* (Doz. et Molk.) Fleisch. habitu similis, sed foliorum forma jam longe diversa.

7. **Symphysodon subneckeroides** Broth. n. sp.

Dioicus; robustus, lutescenti-viridis, aetate fuscescens, nitidus; *caules secundarii* remoti, usque ad 5 cm. longi, stricti, inferne simplices, squamis adpressis, saepe destructis obtecti, dein dense foliosi, complanatuli, dense pinnatim ramosi, ramis pantentibus, usque ad 1.5 cm. longis, strictis, dense foliosis, saepissime breviter flagelliformiter attenuatis, simplicibus vel ramulosis; *folia* plus minusve patentia, cochleariformi-concava, laevia, ovato-oblonga, subito in acumen lanceolatum, saepe semitortum attenuata, marginibus erectis, acumine argutdenticulato, nervo simplici, plus minusve longe infra basin acuminis evanido, cellulis anguste linearibus, basilaribus infimis abbreviatis, laxis, inter se porosis, fuscis, alaribus vix distinctis; *bracteae perichaetii* internae erectae, late et elongate lanceolatae, sensim subulato-attenuatae, superne argute denticulatae, enerves; *seta* brevissima, vix ultra 0.75 mm. alta; theca immersa, erecta, oblonga; *exostomii* dentes per paria connati, longi infra orificium thecae oriundi, ultra orificium c. 0.25 mm., fusco-rubri, laeves *endostomium* imperfectum; spori 0.020–0.025 mm., fusciduli, sublaeves; *operculum* e basi conica breviter rostratum; *calyptra* mitraeformis, pluriloba, operculum tantum obtegens, parce pilosa.

Type specimen 9153, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, March, 1908. Ad arbores.

Species *S. neckeroidi* Doz et Molk. valde affinis sed statura multo robustiore ramisque flagelliformiter attenuatis dignoscenda.

HOOKERIACEÆ

8. **Distichophyllum (Discophyllum) Elmeri** Broth. n. sp

Dioicum; gracile, caespitosum caespitibus, laxis, lutescenti-viridibus, haud nitidis; *caulis* usque ad 1.5 cm. altus, nigricans, laxe foliosus, parce radiculosus, simplex; *folia* sicca crispulo-contracta, humida planiuscula, lateralia e basi angusta oblonga, rotundato-obtusa, minutissime apiculata, usque ad 2.5 mm. longa et c. 0.9 mm. lata, marginibus undulatis, integerrimis, limbata, limbo lutescente, 3-4 seriato, nervo tenui, infra apicem evanido, cellulis subrotundo-hexagonis, internis c. 0.025 mm. apicalibus et lateralibus multo minoribus, c. 0.015 mm., basilaribus oblongo-hexagonis; *dorsalia* et *ventralia* breviora. Caetera ignota.

Type specimen 10453, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

Species *D. nigricauli* Mitt. affinis, sed foliorium forma et limbo latiore dignoscenda.

HYPOPTERYGIACEÆ

9. **Hypopterygium delicatulum** Broth. n. sp.

Tenellum, caespitosum, caespitibus laxiusculis, mollissimis, laete viridibus, haud nitidis; *caulis primarius* longe repens, plus minusve dense fusco-tomentosus; *caules secundarii* sat remoti, usque ad 2 cm. longi, nudi vel basi fusco-tomentosi, inferne simplices, foliis squamaeformibus patentibus, remotis, superne dense pinnatim ramosi, ramis patentibus, vix ultra 7 mm. longis, planiusculis, siccis vix vel leviter deorsum spectantibus, simplicibus, frondem late triangularem vel subrotundum, haud rotulatum efformantibus; *folia caulina* asymmetrica, ovata vel ovalia breviter aristata, limbata, limbo hyalino, biseriato, superne distincte denticulato, nervo ad medium folii vel paulum ultra producto, cellullis ovali-hexagonis, in medio folii c. 0.025 mm. longis et c. 0.012 mm. latis, apicalibus minoribus, *ramea* minora, caeterum caulinis subsimilia; *amphigastria* minuta cordato-subrotunda, subito longe subulato-acuminata, minute denticulata, nervo subnullo. Caetera ignota.

Type specimen 10385, *A. D. E. Elmer*, Dumaguete, Cuernos Mountains, Province of Negros Oriental, Negros, June, 1908. Ad truncos putridos.

Species pulchella, *H. ceylanico* Mitt. affinis, sed ramis duplo fere angustioribus foliisque aristatulis facillime dignoscenda.

10. **Cyathophorum (Cyathophorella) philippinense** Broth. n. sp.

Dioicum; gracile, gregarie crescens, laete viride, haud nitidum; *caulis primarius* dense fusco-tomentosus; *caulis secundarii* approximati, usque ad 4 cm. longi cum foliis usque ad 5 mm. lati, saepe caudiformiter attenuati, densiuscule foliosi, simplices; *folia* sicca plus minusve contracta, faciliter emollita, patula, asymmetrica, ovata, raptim in subulam aristiformen attenuata, superne minutissime vel irregulariter minute serrulata, anguste limbata, nervo brevi, vix 0 25 folii longitudinis, apice saepe bifurco cellulis ovali-hexagonis, basin versus sensim majoribus; *amphigatria* minuta, elimbata, enervia; *seta* 3 mm. alta, apice curvatula, lutescens, laevis; *theca* inclinatula, oblongo-cylindracea, pallide fuscidula; *peristomium* duplex; *exostomii* dentes anguste lanceolati, c. 0.5 mm. longi et c. 0.05 mm. lati, humidi erecti, sicci circinato-incurvi, fusci, valde papillosi, obscuri; *endostomium* luteum, papillosum; *corona basilaris* c. 0.1 mm. alta, *processus* dentium longitudinis, anguste lineares, carinatuli, vix perforati, valde papillosi, obscuri *cilia* rudimentaria; *spori* 0.012-0.015 mm., virides, laeves; *operculum* conico-aciculare. Calyptra ignota.

Type specimen 8544, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

Species pulcherrima, cum *C. parvifolio* Bryol. jav. comparanda, sed stature duplo fere majore oculo nudo jam dignoscenda.

BRACHYTHECIACEÆ

11. **Pleuropus luzonensis** Broth. n. sp.

Dioicus; sat gracilis, caespitosus, caespitibus laxis, lutescenti-viridibus, nitidis; *caulis* elongatus, repens, per totam longitudinem radiculis fuscis substrato affixus, vage divisus, pro parte stoloniformis, densiuscule ramosus, ramis plus minusve erectis, vix ultra 1.5 cm. longis, strictiusculis, dense foliosis, simplicibus; *folia* ramea erecto-patentia, plicata e basi cordato-ovata lanceolato subulata, marginibus inferne late

recurvis, ubique serrulatis, nervo tenui, ad basin subalae evanido, cellulis angustissime linearibus, haud incrassatis, basilaribus infimis abbreviatis, laxis, alaribus paucis ovalibus. Caetera ignota.

Type specimen 8451, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. Ad ligna putrida.

Species *Pl. fenestrato* Griff. valde affinis, sed foliis longius et angustius acuminatis, cellulis alaribus paucis ut videtur diversa.

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LEAFLETS OF PHILIPPINE BOTANY

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MYRSINACEAE FROM MOUNT APO

BY

A. D. E. ELMER

—o—

ARDISIA Swartz

Ardisia mindanaensis Mez in *Engler's* Pflanzenreich IX; 107, 1902.

The type is based on number 14360 collected by *Warburg* on mount "Dagad-Ban" from 2000 to 3000 feet altitude.

Ardisia pardalina Mez in *Engler's* Pflanzenreich IX; 148, 1902.

The type is based on number 14361 collected by *Warburg* on mount "Batangan".

Ardisia warburgiana Mez in *Engler's* Pflanzenreich IX; 143, 1902.

The type is based on number 14358 collected by *Warburg* on mount "Sagatpan".

Ardisia scabrida Mez in *Engler's* Pflanzenreich IX; 113, 1902.

Lax shrub or becoming tree-like; stem 5 cm. thick, mostly branched toward the top; wood sappy white, moderately soft, without odor or taste; bark smooth, grayish brown, that on the twigs green ; branches divaricate, similarly rebranched. Leaves subchartaceous, with strongly recurved tips, deep green above, paler beneath, drying brown, the reticulations equally prominent on both sides, beneath punctate. Inflorescence terminal, the stalks greenish or becoming pink, the odorless flowers upon recurved pedicels; calyx tips and petals pink, or the latter turning whitish; anthers pale yellow; style whitish; fruits reddish, subpendulous.

Represented by numbers 10903 and 11397, *Elmer*. The former number was collected on a forested ridge at 4500 feet on mount Calelan, and was called by the Bagobos "Catigpo-catigpo". The latter number came from 6750 feet on mount Apo and was called "Rais" by the Bagobos. The type is based upon number 14357 collected by *Warburg* on mount "Dagat-Ban" * from 1600 to 2000 feet altitude.

Ardisia punctata Elm. from southern Negros is very close to this species if not identical.

Ardisia copelandii Mez in Philip. Journ. Sci. Suppl. I; 272, 1906.

Tree 10 m. high, with a 2 dm. thick stem; main branches few, toward the top only, ascending, fastigiate; branchlets divaricate, radially spreading, 2 cm. thick, 1 to 2 m. long, occasionally rebranched; twigs slender, heavy, ascendingly curved; wood moderately hard and heavy, reddish throughout, oderless and tasteless, streaked with coal black vessels; bark smooth, whitish mottled and spotted with dark brown. Leaves heavy and leathery, spreading, shining on both sides, shallowly and curvingly conduplicate on the upper side. Inflorescence suberect, terminal, the stalks and

* "Dagad-Ban", "Batangan", "Sagatpan" and "Dagat-Ban" are undoubtedly one and the same mountain situated in one of the mount Apo spurs which extends to Santa Cruz.

calyx whitish; petals rigid, recurved, indigo red; fruit dark red, globose, nearly 8 mm. thick, bearing the persistent style.

Represented by number 10490, *Elmer*, collected in rich soil of humid forests at 4000 feet. The Bagobos call it "Catigpo-tigpo" and eat the ripe fruits which have a pleasant sour flavor. The type is based on number 1242 collected by *Dr. Copeland* at Todaya, April, 1904. Also known from Lake Lanao by *Mrs. Clemens* specimens.

Ardisia racemosa-paniculata Mez in Philip. Journ. Sci. Suppl. I; 273, 1906.

Erect tree, 7 m. high, with a 1 dm. thick stem; branches few or more, divaricate, relatively short, sparingly rebranched; twigs gray, slender, at right angles to the main branches, radially spreading, much thickened at the base; wood moderately hard or soft, the sapwood whitish, reddish toward the center, with conspicuous rays, odorless and tasteless; bark smooth, gray and brown mottled. Leaves subcoriaceous, horizontally spreading, nearly flat, tips recurved slightly, dark green above, much paler beneath, the petiole and main nerves reddish. Inflorescence ascending, all its stalks red; calyx and petals pink or whitish; anthers yellow; buds and odorless flowers pendulous.

Represented by numbers 10512 and 10748, *Elmer*, collected in dense forests at 4000 feet. Called by the Bagobos "Catigpo-tigpo." The type is based on number 1187 collected by *Copeland* at 5000 feet, April, 1904. Otherwise not known.

Ardisia sibulanensis Elm. n. sp.

An undershrub 1 m. high or less; stem 1 cm. thick at or toward the base, unbranched, brittle, crooked, greenish, the young portion finely grayish white lenticelled. Leaves chiefly crowded toward the top, ascending, coriaceous, flat, with recurved tips, sublucid above, much paler beneath, 15 cm. long, 3 to 4 cm. wide across the middle, lanceolate, acuminate, base slenderly attenuate, glabrous on both sides, alternate, margins crenulate except toward the base and at the apex; midvein very prominent beneath, the lateral ones

numerous and usually branched toward the ends, the sides of the blades decurrent nearly to the base of the 1 cm. long petiole. Inflorescence recurved from the lowermost leaf axils, spicately racemose, its stalks red, 1 to 2 cm. long; flowers odorless; peduncle proper red, 1 cm. long, terete, at least 1 mm. thick, pulverulent or minutely scurfy in the young state; pedicels red, crowded along the upper portion of the rachis or axis, 8 mm. long, spreading, numerous, similar to the peduncle in vestiture, thickened toward the apex, subtended at the base by minute bracts; calyx composed of 5 segments; segments triangularly elongated, 2.5 mm. long, 1.5 mm. wide across the base, acuminate, the central portion dark brown in the dry state, greenish white or the tips becoming red, the margins provided with fine brown colored tack-shaped glands, otherwise glabrous or with only a few similar glands scattered over the dorsal side, the upper one half, conduplicate on the ventral side, reflexed in anthesis; corolla 5-segmented, twisted and imbricated in the bud; the segments divided nearly to the base, ultimately rotately spreading, glabrous on the dorsal side, provided with a few scattering glands, 5 mm. long, 2.5 mm. wide across the middle or a trifle below it, subovately oblong, terminating in an obtuse usually twisted apex; stamens sessily inserted upon the base of the corolla segments; anthers light yellow, 3.5 mm. long, at least 1 mm. wide at the base, triangularly elongated, mostly included, laterally dehiscent; ovary globose, 1 mm. in diameter, glabrous; style whitish, 3 to 4 mm. long, terete, slender, glabrous, arising from the ovary apex, terminated by a small stigma; immature fruits glabrous, globose or nearly so, at least 5 mm. in diameter, bearing a short vestige of the style.

Type specimen 11165, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, July, 1909.

Discovered in wet stony soil along a densely wooded creek bottom near the Sibulan river at 2000 feet altitude. Quite rare! The Bagobos call it "Catig-catigpo".

Related to *A. warburgiana Mez*, but young branches not densely covered with capitate hairs, petioles and pedicels twice as long in our specimens and inflorescence more numerously flowered.

Ardisia apoensis Elm. n. sp.

A low suffrutescent perennial; stem flexible, crooked, 3 dm. long, occasionally branched, young portion densely brown scurfy, arising from the long coarse wiry roots; bark thin, grayish brown, in the dry state wrinkled. Leaves horizontal, thinly coriaceous, velvety deep green above, the middle portion and along the larger lateral veins whitish, nearly flat, beneath much paler and provided with minute clusters of brown scurfy scales, lanceolate, the larger ones 8 cm. long, about 2 cm. wide across the middle, acuminate, base attenuate, margins entire, alternatingly scattered along the stems and branches but usually more crowded toward the apex; midvein prominent, the lateral nerves obscure; petiole 5 to 10 mm. long, densely brown scurfy in the young state, becoming nearly glabrous. Infrutescence arising from the upper leaf axils, all its stalks green; slender peduncles ascending, 1 to 2 cm. long, scurfy brown; pedicels similar in vestiture, slightly thinner, only 1 cm. long, divaricately spreading, a trifle thickened toward the apex, few to several, at the base subtended by a few small bracts; calyx united at the base, 5-segmented; segments triangularly acute, 1.25 mm. long, 0.75 mm. wide at the base, the middle dorsal portion and the margins more or less finely scurfy; fruit globose except the somewhat flattened base, vermillion red, varying from 5 to 8 mm. in diameter, longitudinally striate at least in the dry state, bearing the persistent setulose 3 mm. long style; seed solitary, globose except for the flattened or sunken base.

Type specimen 11890, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, September, 1909.

Collected in rich humus covered soil on a densely forested ridge at 4000 feet, south of Mount Apo, on the trail from Todaya to Talon. Very rare and pretty! The Bagobos call it "Cari-cari".

Apparently nearest to *A. mindanaensis Mez*, but the pedicels in our specimens are more than twice as long, the leaves have very characteristic grayish white middle zones.

Ardisia fragrans Elm. n. sp.

Tree 9 m. high, at least 2 dm. thick, bearing only a few branches at the top; branchlets numerous toward the end of the main branches, ascending or divaricately spreading, unbranched, much thickened and flattened at the base; wood sappy white, becoming reddish toward the center, soft, without odor or taste; bark smoothish, brown, yellowish gray on the branches; twigs glabrous. Leaves alternatingly scattered along the branchlets especially toward their ends, ascending, tips recurved, folded upon the upper darker green and lucid surface, coriaceous, narrowly oblong or lanceolate, glabrous, at least 1 dm. long, 3 cm. wide, quite variable in size, much paler green beneath, apex acute to acuminate, base cuneate, margins entire and usually with a string of submarginal punctate glands; midvein conspicuous beneath, the 15 lateral ones much less conspicuous, reticulations scarcely visible; petiole glabrous, 1.5 cm. long, grooved along the upper side. Inflorescence from the uppermost leaf axils, averaging 1 dm. in length, glabrous, paniculately branched from below the middle, all the stalks pale green and more or less angular, ascendingly curved; pedicels scattering along the branchlets, usually recurved, 3 mm. long, subtended by acuminate deciduous bracts; sepals 5, the segments nearly divided to the base, ovately oblong, glabrous, scarcely longer than 1.5 mm., at least 1 mm. wide below the middle, the margins finely fringed, greenish white, the inner surface with a few scattering glands; corolla also 5-segmented; the petals nearly free, with smooth margins, pale white, broadly oblong, nearly 4 mm. long, 2.5 mm. wide across the middle, glabrous, with only a few punctate glands, obtuse, deeply convex on the dorsal side, the nerves obscure, not twisted, imbricate; stamens 5, opposite the corolla segments, mostly included; filaments thick, flattened, of the same color as the segments, glabrous, with a few punctate glands, 0.75 mm. long, inserted upon the base of the corolla; anther rugose, 2 mm. long, roundly pointed, 1 mm. wide across the base, basifixed, laterally dehiscent, subcordate at the base; ovary superior, subglobose, at least 1 mm. in diameter; style

white, arising from the ovary apex, terete, fleshy, 2 mm. long, strict, coming to a somewhat smaller blunt stigmatic point, glabrous; fruit flatly globose, about 8 mm. in diameter, dark brown or nearly black.

Type specimen 11647, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, September, 1909.

Discovered in moist fertile soil of damp forests at 4000 feet, on the trail from Todaya to Talon. It was only once or twice observed and its whitish flowers are sweetly fragrant. The Bagobos call it "Catigpo-tigpo."

Not *A. jagorii Mez*, because of the shortness of the pedicels and character of the calyx.

Ardisia clementis Elm. n. sp.

A slender, erect tree, 10 m. high, with a 2 dm. thick stem; branches relatively short, forming an elongated crown; twigs coarse, glabrous; wood odorless and tasteless, rather soft, white or the central portion reddish, the radial lines conspicuous; bark smooth, yellowish brown mottled. Leaves coriaceous, slightly recurved and conduplicate on the upper dark green surface, paler beneath, divaricately spreading, glabrous, oblong, 1.5 to 2 dm. long, 7.5 cm. wide across the middle or a trifle above this, apex acute, base obtuse or rounded, margins entire; midvein very stout and prominent below, the 10 to 15 lateral ones less prominent and strongly arched toward their ends, reticulations visible; petiole glabrous, 3 mm. thick, 1 to 1.5 cm. long. Inflorescence terminal or arising from the base of leafy branchlets, 1 to 1.5 dm. long, paniculate, the sparse branches divaricate, erect, rigid, heavy, all the stalks reddish, subglabrous or clothed with a short dark brown pulverulence; main branches divaricate, sparingly rebranched, bearing toward the end several odorless flowers; pedicels usually recurved, 5 to 10 mm. long, at the base subtended by broad but short bracts covered with a fine brown pulverulence; the reddish segments of the calyx 5, subglabrous, with scattering brown glands on the dorsal side of the central portion, margins only finely ciliate, imbricate, divided to below the middle, orbicular to rotund, 3.5 mm. across; corolla also 5-seg-

mented, red; the basal portion of the segments united and forming a short tube, glabrous, with scattering glands on the dorsal side, margins smooth, ovately oblong, 8 mm. long, 5 mm. wide across the middle or a trifle below this, apex obtuse or subacute; stamens 5, opposite the corolla segments and included by them; filaments arising from the throat of the corolla tube, 0.5 mm. long, stout, flattened especially toward the base; anther basifixed, 4 mm. long, 2 mm. wide across the cordate base, acutely pointed, dehiscent laterally; ovary 2 mm. in diameter, subglobose, glabrous; style 3 mm. long, rather stout and straight, gradually tapering from the ovary apex to the small stigma; fruits not seen.

Type specimen 11271, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, August, 1909. The Bagobos call it "Catigpo".

Discovered in moist fertile soil of a densely forested humid flat at 3500 feet altitude. Also known from the Lake Lanao region by a few fruiting specimens collected by *Mrs. Clemens.* Named in honor of *Mrs. Mary Strong Clemens* whose interest in botany and untiring energy during her brief stay at Camp Keithley, Lake Lanao, Mindanao, will always be remembered in botanical history of the Philippines.

In general characters similar to *Discocalyx psychotrioides Elm.*, but not the same species.

MAESA Forsk.

Maesa denticulata Mez in *Engler's* Pflanzenreich IX; 48, 1902.

Lax undershrub; stem 2 m. long, 3 cm. thick, terete, branched from below the middle; wood greenish, soft, odorless and tasteless; bark brown, densely lenticelled; twigs glabrous, slender, somewhat drooping. Leaves descending, ultimately recurved, paler beneath, thinly coriaceous. Inflorescence ascending from the leaf axils, greenish or green except the pure white corolla and yellow anthers, odorless; mature fruit "Snowberry" white, elongated ellipsoid, 7.5 mm. across or less, the yellowish receptacle bearing numerous black seeds.

Represented by number 10968, *Elmer*, collected in fertile soil of deep woods along the Baracatan creek at 1500 feet altitude. "Mabalid-ta-pangpang" is the Bagobo name. The type is based upon numbers 13528, 13529 and 15025 collected by *Warburg* on the island of Luzon. Known from nearly all localities so far visited by botanical collectors.

Maesa platyphylla Elm. n. sp.

A tree-like shrub 5 m. high, with a 5 to 8 cm. thick stem; branches rather slender, not numerous; wood soft, sappy white, without taste or odor; bark dark brown, densely covered with lenticels. Leaves coriaceous, flat, spreading horizontally or descending, dull green on the upper side, much paler beneath, glabrous, drying brownish, margins entire or minutelv apiculate, oblong, the larger blades 2 dm. long, nearly 1 dm. across the middle, apex acute, base obtuse or rounded; veins conspicuous beneath, the 8 to 11 lateral pairs ascending, dark brown as is also the midvein, usually forked toward the distal end; petiole 3 to 4 cm. long, glabrous. Inflorescence 1 dm. long, paniculately branched from the base, glabrous; branches rather slender, not numerously rebranched; pedicels 1 to 2 mm. long, scattered all along the branchlets, subtended by short but sharply acuminate bracts; calyx 5-segmented; segments united below the middle, the free portion broadly ovate, obtuse, with smooth margins, glabrous, 1.5 mm. long including the basal portion, 0.75 mm. wide below the middle of the free portion, subtended by a few small bracts; corolla also 5-segmented; the segments united below the middle, inserted upon the throat of the calyx, nearly 2 mm. long, the free portion 1.5 mm. wide, margins smooth, 2 to several-nerved, broadly rounded; stamens as many as segments, opposite; filaments very short, inserted upon the middle portion of the corolla segments a trifle below the middle, glabrous; anther orbicular, 0.25 mm. across; ovary partly imbedded in the basal portion of the calyx, glabrous, broadly flattened at the apex; style also glabrous, short, pedestal-like, bearing an expanded more or less 4-lobed stigma; ovules numerous, upon a central

erect placenta; fruit 5 mm. in diameter, globose, pale or light yellow, sweet and juicy; seeds numerous, triquetrous, 0.75 mm. across, bony, dark brown, finely rugose.

Type specimen 10570, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, May, 1909.

Collected in dense woods of moist rich soil on mount Calelan at 4000 feet altitude. "Tabing" is the vernacular name given by the Bagobos.

EMBELIA Burm.

Embelia philippinensis DC. Prod. VIII; 83, 1844.

A woody climber and sprawling over thickets and light woods; stem terete, 3 to 5 cm. thick, gray, minutely checked, reddish brown beneath the skin; wood flexible, whitish, porous, odorless and tasteless; twigs slender and more or less drooping, dark green, covered with brown lenticels. Leaves thickly coriaceous, horizontal, tips slightly recurved, shallowly conduplicate on the darker green surface. Inflorescence ascending or drooping, greenish except the yellow anthers; the 5 petals also yellowish; stigmas brown; flowers odorless.

Represented by number 11606, *A. D. E. Elmer*, collected in woods skirting grass lands at 3250 feet altitude. The Bagobos call it "Balacoa". The type was based on number 1001 collected by *Cuming*, probably in the province of Pangasinan, Luzon. Widely distributed in the Philippines.

Embelia whitfordii Merr. in Philip. Journ. Sci. Suppl. I; 113, 1906.

A looping lofty tree climber; stem flexible, 5 cm. thick, subterete; branches widely sprawling and forming a tangled mass, the free ends rather long and drooping; wood soft, reddish toward the center, odorless, with a distinct sweet taste; bark smooth, grayish brown, green and lenticelled on the branchlets. Leaves flat, coriaceous, paler green beneath. Inflorescence upon slender terminal shoots, odorless, creamy white, the small flowers yellow.

Represented by number 11260, *Elmer*, collected on a wooded ridge of mount Burebid in one of mount Apo's spurs extending toward Santa Cruz. "Mangauwat" is the Bagobo name. The type is based on number 1308 collected by *Whitford* along the Lamao river of mount Mariveles. Most of our material so far collected is from Luzon.

Embelia coriacea Wall. Cat. 2314, 1829.

A lofty climbing shrub, sprawling over the limbs of trees; stems and branches flexible, terete, brown, densely covered with lighter brown colored lenticels; twigs slender, drooping. Leaves rigidly coriaceous, dark green above and shallowly conduplicate, only the tips recurved, much lighter green beneath, more or less descending. Inflorescence yellowish green, the minute odorless flowers deciduous.

Represented by number 11305, *Elmer*, collected in a dense humid forested flat at 4000 feet altitude, on the trial from Todaya to mount Apo. This same species was observed to be very abundant at Baclayan, the camping place at 6500 feet or only a few thousand feet below the summit of that mountain. The Bagobos call it "Tagima". *Mrs. Clemens* collected several specimens of it in the Lake Lanao region. Otherwise not known from the Philippines.

RAPANEA Aubl.

Rapanea apoensis Elm. n. sp.

A slender tree, 5 m. high, with an 8 to 12 cm. thick stem; branches laxly spreading, numerous, the young portion of the relatively short twigs glandularly scurfy or pulverulent, provided with grayish lenticels; sapwood white, turning reddish toward the center, quite hard, odorless and tasteless; smooth bark brown, dotted with large yellowish lenticels. Leaves alternate, scattered, oblongish lanceolate, averaging 3 cm. long, 1.5 cm. wide across the middle, coriaceous, flat, with only recurved tips, deep shining green above, much paler beneath, apex obtuse to acute, base cuneate, glabrous, entire; midvein

conspicuous beneath, the lateral ones obscure; petiole 5 mm. long, in the young state glandular brown scurfy or pulverulent, ultimately glabrous. Inflorescence upon short bracteate tubercles, axillary; pedicels at most 5 mm. long, becoming glabrous; the subtending bracts brown, imbricate, glabrous except the finely ciliate margins, triangularly ovate to oblong; calyx 6-segmented; the upper one third of the segments free, subcampanulate, oblong, 1.5 mm. long, 1 mm. wide, obtuse, the margins finely ciliate, otherwise glabrous except for the reddish brown glands scattered above the middle of the dorsal side; corolla 4-segmented; the segments inserted upon the basal portion of the calyx, oblongish lanceolate, 3 mm. long, 1 mm. wide across the middle, bluntly terminated into an acute point or apex, the basal one third united but ultimately separating, margins minutely ciliate, otherwise glabrous except for the numerous elongated reddish brown glands crowded chiefly above the middle, when old reflexed and subpersistent; stamens 4, opposite the corolla segments; filaments distinct but very short, glabrous, inserted upon the base of the corolla throat, subcompressed; anther oblong, 1 mm. wide, 1.5 mm. long, bilobed at the base, basifixed, obtuse at apex, laterally dehiscent, subpersistent; ovary partly imbedded by the fleshy basal portion of the calyx; stigma short, fleshy, ultimately divided into irregular stigmatic terminal segments which arise from the brown colored circular apical portion of the ovary; fruit obovoidly globose, nearly 5 mm. long, 3 mm. thick above the middle, longitudinally striate, bearing a short point, pale blue; seed stony, solitary, the base excavated, reddish brown, rugulose.

Type specimen 10629, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, May, 1909.

Discovered on a moss covered forested ridge of mount Calelan at 7500 feet altitude. The Bagobos call it "Marintok."

Possibly nearest to *R. buxifolia* (*Hance*) *Mez* of China.

Rapanea fastigiata Elm. n. sp.

Tree 7 m. high, with a 2 dm. thick stem; branches many from the middle, ascending, the ultimate ones numerous and parallel or fastigiate; wood moderately hard, red-

dish, odorless and tasteless; bark gray, roughened with coarse lenticels; twigs glabrous, relatively short. Leaves minutely punctate beneath, oblong, 6 cm. long, 2 cm. wide across the middle, coriaceous, flat, tips somewhat recurved, shining dark green above, paler beneath, apex bluntly obtuse or acute, base cuneate, margins entire; midvein prominent beneath, the lateral ones very obscure; petiole 5 mm. long, glabrous. Inflorescence densely clustered toward the ends of the numerous branchlets, in small bracteate clusters, mostly arising from the leaf axils; tubercles 5 mm. long, 2 mm. thick, densely covered with imbricate scales or bracts; bracts rather broad, glabrous and only obscurely ciliate; pedicels several from the same cluster, glabrous, 3 to 5 mm. long, greenish; calyx 5-segmented; the sepals united above the middle, 1.5 mm. long, nearly as wide, broadly ovate, apex rounded, the free portion of the finely ciliated margin overlapping, glabrous, quite rigid, bearing comparatively large reddish brown glands, corolla of an equal number of segments, slightly united about the base; segments 2.5 mm. long, 1 mm. wide across the middle, oblongish, roundly obtuse at apex, margins finely and densely ciliate, thickly covered with reddish brown glands, except at the base, ultimately reflexed; stamens 5, opposite the petals and included by them; filament evident but very short, glabrous, upon and adnate to the basal portion of the segment; anther at least 1 mm. long. 0.5 mm. wide, gradually tapering from the base to the blunt apex; ovary glabrous, conical, 1 mm. thick at the base, terminated by a nearly sessile stigma; fruit not seen.

Type specimen 11447, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, August, 1909.

Collected in black moist soil of dense woods bordering small grass glens at 6750 feet of mount Apo. In this locality it is abundant and ranges from the Baclayan camp up to 8000 feet altitude. The Bagobos call it "Tongog".

Related to, but apparently different from *R. avenis Mez.*

Rapanea mindanaensis Elm. n. sp.

Tree 8 m. high, with a 2 dm. thick stem; branches chiefly at the top, numerously rebranched; twigs ascending,

lax, glabrous; wood hard, without odor or taste, reddish throughout; bark mostly brown, with gray blotches. Leaves flat, with recurved tips, glabrous, ascending, coriaceous, deep green above, much lighter so beneath and with minute dots, oblanceolate, alternatingly scattered and quite numerous, the minutely revolute margins entire, 5 to 7 cm. long, 1 to 2 cm. wide above the middle, apex acute to acuminate, base gradually attenuate; midvein conspicuous beneath, the lateral veins obscure; petiole 1 cm. long, glabrous. Infrutescence arising from very short densely bracteate tubercles chiefly in the axils of the fallen leaves along the branchlets below the foliage; pedicels divaricately spreading, straight, glabrous, 5 mm. long, several in the cluster; the subtending bracts glabrous, imbricate, short; calyx 4-segmented; the segments united below the middle, triangular to oblongish in outline, apex acute or obtuse, glabrous at least in the fruiting state, margin subentire or only with a very fine fringe; fruit globosely flattened, 3 to 4 mm. in diameter, finely striate longitudinally when dry, apex apiculate, wash-blue when mature.

Type specimen 11332, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, August, 1909. Also number 11820, *Elmer*.

Collected in moist humus covered soil on a forested ridge at 4250 feet of mount Calelan. The latter number was gathered near the Mainit creek at the same altitude on the trail from Todaya to Baclayan, and is less typical. The one the Bagobos call "Tongog" the other "Baliuc".

Allied to *R. philippinensis* (*DC.*) *Mez*, but leaves not strictly oblong nor with rounded apices. *Elmer's* number 12295 from Sibuyan island has typical leaves of *de Candolle's* species.

Rapanea venosus Elm. n. sp.

A gnarly tree 6 m. high or higher, 2 dm. thick; main branches ascending, arising from below the middle, ultimately many branched, gray and more or less provided with yellowish brown lenticels; wood hard and brittle, odorless and tasteless, the sapwood whitish, reddish toward the center; bark brown, reddish beneath the epidermis, easily separating; twigs

ascending, glabrous. Leaves ascending, apex recurved, rigidly coriaceous, lucid dark green above, much lighter green beneath, glabrous, punctate on the upper surface, oblong, 1 dm. long, nearly 4 cm. wide across the middle or just above this, apex obtuse, base abruptly cuneate, margins entire and revolute in the dry state; midvein prominent beneath; the 15 or more lateral ones equally plain on both sides and with submarginally united ends, the reticulations fine and very evident especially from the upper side; petiole glabrous, nearly 1 cm. long. Inflorescence from axillary tubercles 5 mm. long and 3 mm. thick; the bracts glabrous, numerous, densely imbricate, ovately triangular; pedicels also glabrous, spreading in fruit, 5 mm. long; calyx 4-lobed; the basal one third of the segments united, glabrous but spotted with reddish brown glands, margins smooth or minutely ciliate, 1.5 mm. long, 1 mm. wide toward the base, ovately oblong, obtuse or acute at the apex; corolla segments of the same number, only the bases united and ultimately becoming free, oblong, nearly 3 mm. long, 1.5 mm. wide across the middle, apex obtuse, margins very finely and densely ciliate, thickly spotted or streaked with reddish brown glands; stamens 4, opposite the corolla segments; filaments glabrous, flattened, scarcely exceeding 0.5 mm. in length, inserted upon or adnate to the petals; anther nearly 2 mm. long, bluntly obtuse at apex, bilobed at base, basifixed, dehiscent through lateral slits, about 1.5 mm. wide across the base; ovary superior, glabrous, subglobose, 0.75 mm. in diameter, bearing a terminal papillose subsessile stigma; fruits blue, globosely flattened, 5 mm. in diameter.

Type specimen 11445, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, August, 1909; also number 11456, *Elmer*.

Both these numbers were collected above Baclayan at about 7000 feet on mount Apo. This species is quite common and associated with *R. fastigiata Elm.* in rigid well interlaced woods bordering open grassy glens. The Bagobos call it "Tongog".

Probably nearest to *R. myricifolia (Gray) Mez* with slenderer branches and pedicels more than twice as long as in our specimen.

DISCOCALYX Mez

Discocalyx mindanaensis Elm. n. sp.

A strict tree-like shrub, 3 m. high, with a 4 cm. thick stem; branches few at the top only, divaricate, 1 to 2 m. long, sparingly rebranched, 1 to 1.5 cm. thick, the young apical portion glabrous; wood white, without taste or odor; bark smooth, yellowish brown. Leaves chartaceous, horizontally spreading, flat, dull and deep green above, much lighter green beneath, 3 dm. long or longer, about 9 cm. wide above the middle, bluntly oblanceolate, gradually tapering toward the cuneate base, apex rounded and with a short acute point, glabrous, entire; midvein very prominent beneath, grooved along the upper side toward the base; lateral ones oblique, much curved toward the distal end, 9 to 12 on each side, with a few secondary ones scattered in between, the fine reticulations quite evident especially beneath; petiole 2 to 3 cm. long, 5 mm. thick toward the base. Inflorescence of few to several paniculate stalks, arising in the region between the terminal bud and the leaves, 1 to 2 dm. long, erect or ascending, all the glabrous stalks pale red; branches from below the middle, alternatingly scattered, more or less densely flowered, relatively short; pedicels spreading, 1 to 2 mm. long, glabrous; calyx 4-segmented; sepals glabrous, with a few scattered glands along the median line, the basal one third united, margins smooth, rotately spreading in anthesis, oblong, with obscurely rounded apices, 1.25 mm. long, 0.75 mm. wide; corolla likewise 4-segmented; petals not twisted in the bud and the smooth margins only slightly overlapping, nearly free, oblong, obtuse to acute, 2.5 mm. long, 1.5 mm. wide across the middle, dark brown, glandularly dotted in the middle region above the middle; stamens 4, opposite the corolla segments and included by them; filaments, glabrous, subterete, arising from the base of the segments, nearly 1 mm. long; anther basifixed, oval, about 0.5 mm. across, dehiscent laterally; ovary glabrous, ovoidly elongated, 1 mm. long, bearing a sessile brown colored stigma or nearly obsolete or entirely wanting in most flowers.

Type specimen 11294, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, August, 1909.

Discovered in fertile humus covered soil of dense humid forests at 4000 feet altitude. Called by the Bagobos "Samaluco".

The author is not certain as to the genus, but apparently it is related to *Discocalyx montana Elm.* and to *Embelia proteana Mez.*

LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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A DECADE OF NEW PLANTS

BY

A. D. E. ELMER

—o—

URTICACEÆ

Leucosyke magallanensis Elm. n. sp.

Shrub; stem 5 m. high, 15 cm. thick, branched from below the middle; branchlets many, slender, hispidly pubescent, usually drooping, tips suberect; wood moderately hard and heavy, reddish except the white sapwood, without odor or taste; bark smooth, mottled. Leaves horizontal, chartaceous, a trifle recurved, the upper deeper green surface glabrous, sprinkled with whitish hairs, beneath whitish and bristly pubescent on the nerves, alternate, mostly at the ends of the branchlets, the average blades 1 dm. long, one half as wide across the middle, acute at apex, obtuse or subrounded at base, entire toward the base, finely serrate otherwise; nerves 5 from the base, subparellel, the middle one with 3 ascending pairs arising from above the middle, cross bars relatively conspicuous, all yellowish brown and provided with bristly white hairs; petiole 1 cm. long, white hairy; stipules brown, deciduous, 1.5 cm. long, the back finely

scurfy and with appressed white hairs, oblong, the 2 nerves extending into sharply acuminate points. Inflorescence mostly clustered along the branchlets below the foliage; peduncles solitary or 2 to 3-clustered from the old leaf axils, subtended by short rather rigid bracts, 7.5 mm. long, quite thick and deep green in the fresh state, hispidly canescent; the staminate heads at least 1 cm. in diameter; bracts nearly 3 mm. long, the outer ones broader and usually pubescent on the exposed dorsal sides, the inner ones narrower and with apical margins fimbriate; pedicels about 4 mm. long, subglabrous, slightly thickened toward the apex; flower articulate and easily separating from the subpersistent pedicels; perianth nearly 3 mm. long, subglabrous and finely glandular, united toward the base, the 4 segments oblongish with acuminate apices; stamens 4, opposite the segments, slightly longer than the perianth, glabrous except the woolly matrix at the base, crinked above the middle; anthers elliptic, 1 mm. long, versatile; female flowers and fruits not seen.

Type specimen 12282, *A. D. E. Elmer*, Magallanes (Mt. Giting-giting), Province of Capiz, Island of Sibuyan, April, 1910.

Discovered in red soil underlaid with gravel and bowlders along the densely wooded banks of the Patoo river at 1000 feet.

Probably *L. hispidissima Miq.*, but leaves in our specimens crowded toward the ends of the twigs and with much shorter petioles; branchlets hispidly hairy, not puberulous; and staminate heads apparently larger.

EUPHORBIACEÆ

Macaranga noblei Elm. n. sp.

A stocky flat-topped tree; stem 8 m. high, 3 dm. thick, subterete, strictly erect; branches from above the middle, crookedly rebranched, forming a widely spreading crown; twigs thick, grayish green, not numerously rebranched, the leaf bearing tips ascendingly curved; wood white, light, odorless and tasteless; bark brown beneath the rather smooth grayish white mottled epidermis. Leaves chartaceous, horizon-

tally spreading, dull green on the minutely stellate pubescent upper surface, much lighter green or glaucescent on the lower glandular and more densely stellate pubescent side, alternate, the blades diverse in size, drying brown, broadly ovate in shape, peltate, some of the larger ones 3 dm. long, 2.5 dm. wide below the middle, truncate at the base or rounded or occasionally shallowly emarginate, the margins with densely pubescent points, apex slenderly caudate; midvein conspicuous, short brown pubescent, with 10 to 13 lateral and ascending pairs which terminate into minute points; the basal ascending pair with 9 secondary lateral ones on the lower side, the backwardly extending nerves about 9; cross bars numerous and quite evident; petiole 1.5 to 2 dm. long, terete, glaucous green, both glandular and puberulent; stipule 2 to 3 cm. long, slenderly acuminate, gradually tapering from the base, densely brown tomentose on both sides, deciduous. Panicle scattered along the branchlets, 1.5 to 3 dm. long; the main branches similar to the petioles, branched from below the middle; branchlets relatively short, brown tomentose, subtended by minute bracts, all stalks yellowish green in the fresh state; pistillate flowers several, sessily clustered and subtended by caducous flesh red bracts; bracts 7.5 mm. long, 5 mm. wide near the base, densely tomentose, ovate in outline, glandular dotted on the outer strongly convex side, 5 to 7, pectinately lobed; fruits covered with a glandular powder, 3 mm. long, 5 mm. wide, upon short pubescent stalks, 2-celled and 2-seeded for the most part; seeds 2 mm. long, rounded at the top, more or less pointed at the base.

Type specimen 10816, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, June, 1909.

A handsome low spreading tree on steep wooded flanks along the south side of the Baruring river at 3250 feet. "Panelid" is the Bagobo name. Dedicated to 1st Lieut. W. H. Noble with whom I had the pleasure of registering in the brass tube on the highest peak of Apo on October 4, 1909.

The fruit at once distinguishes it from the common *M. tanarius Muell. Arg.*

CAPPARIDACEÆ

Capparis copelandii Elm. n. sp.

A scandent shrub; stem scatteringly branched; branches rather long, terete, tough, green, brown puberulent, the free ends slender and drooping, hooked; spines stout but rather short, slightly recurved, the thickened basal portion pubescent, usually along the lower side or taking the place of the leaf stipules. Leaves alternatingly scattered, coriaceous, divaricately spreading, drying light green, slightly recurved, smooth and deep green on the upper surface, a trifle paler and soft pubescent beneath, oblong, the larger blades 15 cm. long, 5.5 cm. wide across the middle, apex gradually acuminate, rounded at the base, slightly emarginate at the insertion of the petiole, the entire margins subinvolute in the dry state; midvein smooth and sunken on the upper side, beneath dirty brown pubescent, with 7 to 9 arcuate lateral pairs, reticulations not evident; petiole stout, 5 to 8 mm. long, densely brown tomentose. Flowers not seen; fruits nearly 5 cm. in diameter, globose, hard, shining green, several-seeded, pendulous; peduncle 5 to 8 cm. long, only sparingly branched, terete, glabrous; pedicels also glabrous and terete, usually somewhat thickened, 3 to 5 cm. long, green as are also the stalks.

Type specimen 10943, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, June, 1909.

A woody tree climber on wooded banks along the Baracatan creek at 1500 feet. Named after *Dr. Copeland* who first collected it in March, 1904. The natives or Bagobos call it "Sulo-sulo".

THYMELEACEÆ

Wikstroemia linearifolia Elm. n. sp.

Shrub; stem 3 to 4 m. high, 8 cm. thick, branched from the middle or below it, the main branches ascending, finally very numerously rebranched; twigs lax and relatively short; wood whitish, very tough, slightly bitter, odorless; bark smooth, tough and easily stripping, gray and brown

mixed. Leaves copious, submembranous, horizontal or descending, nearly flat, opposite, glabrous, deep pleasing green above, glaucous green beneath, drying greenish brown, the entire margins subinvolute, 3 to 4 cm. long, 6 to 8 mm. long, linear to linearly oblong, similarly tapering toward both rounded ends; midvein conspicuous, with 8 to 13 much ascending obscure pairs, the few reticulations faint; petioles 2 to 3 mm. long, subglabrous, articulate to the finely puberulent twigs. Flowers usually few-clustered, upon very short stalks which are pubescent, from the uppermost leaf axils, sessile; corolla 7 mm. long, yellowish green, glabrous, tubular, the base constricted; lobes 4, ovately oblong, 2 mm. long, venose; stamens 10, in an upper and lower series; the upper 5 a trifle below the throat, upon slender 0.5 mm. long filaments, with basifixed orange red anthers, subelliptic and 1 mm. long; the lower 5 inserted a few mm. below the upper series and usually a trifle smaller; ovary brown elongate ellipsoid, 1.5 mm. long, strigosely hairy toward the top, inserted 1 or 2 mm. from the base of the corolla base; style 0.5 mm. long, bearing a large capitate stigma; ripe fruit short ellipsoid, 6 mm. in diameter, juicy, with a crustaceous seed, "huckle-berry" red.

Type specimen 12218, *A. D. E. Elmer*, Magallanes (Mt. Giting-giting), Province of Capiz, Island of Sibuyan, April, 1910.

Lax and finely branched shrubs in moist gravelly soil along the banks of the Pauala river at 750 feet. The local Visayan call it "Inyam".

W. viridiflora Meisn., but leaves and fruits different. Most authors consider *Meisner's* species the same as *W. indica Mey.*

STERCULIACEÆ

Sterculia humilis Elm. n. sp.

A strictly erect suffrutescent shrub; stem mostly unbranched, 1 m. high, 7.5 mm. thick, terete; wood quite tough, covered with grayish brown bark. Leaves ascending, subchartaceous, alternatingly clustered at the top of the more or less fulvous brown terminal portion, oblanceolate, the average ones 25 cm.

long, 7.5 cm. wide above the middle, entire, apex acute to acuminate, slenderly tapering toward the abruptly rounded base; midvein conspicuously raised and smooth beneath, short fulvous hairy along the upper side; lateral ones about 10 on each side, pinnate, with arcuate tips which are reticulately united, the cross bars quite evident; petiole 5 to 8 mm. long, very thick, densely covered with a fulvous tomentum; stipule 1 cm. long, linear, sharply acuminate, dry, brown, usually hairy, subpersistent. Inflorescence terminal, erect; spike about 1 dm. long, similarly pubescent, the short lateral branches subtended by similar bracts. Flowers 15 mm. long, broadly tubular, upon short pedicels, fulvous hairy on the outside, with 5 recurved segments 5 mm. long.

Type specimen 11204, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, July, 1909.

An undershrub in rich moist alluvial soil of deep dense woods along the Sibulan river at 2500 feet. Rare!

SAXIFRAGACEÆ

Dedea apoense Elm. n. sp.

Small erect tree, 7 m. high, 2 dm. thick; branches from the middle, divaricate, fine and relatively short, forming an elongated crown; twigs rather numerous, with ascending young tips which are usually pulverulent; wood soft, sappy white, odorless and tasteless; bark smooth, brown. Leaves alternatingly crowded toward the ends of the branchlets, also numerous, ascending, rigidly coriaceous, folded upon the upper dull green glabrous surface, much lighter green upon the lower glandular and slightly pulverulent side, entire margins involute in the dry state, the average blade 7.5 cm. long, 2.5 cm. wide across the middle, frequently much smaller, oblong or the smallest ones oblanceolate, obtuse at apex, obtuse or rather cuneate at base, drying brown; midvein brown, depressed on the upper side, conspicuously raised on the lower side clear to the apex, the 9 to 11 pinnate lateral pairs quite obscure; petiole 1 to 1.5 cm. long, yellowish pulverulent. Inflorescent spike arising from the leaf axils, usually solitary, ascending, scarcely exceeding the foliage; rachis greenish,

angularly flattened in the dry state, similarly pulverulent, flower bearing from below the middle; pedicel 8 mm. long, usually striate, smooth or very finely glandular; calyx similarly glandular, turbinate, 2.5 mm. long, with 4 blunt and short teeth; petiole as many and alternating with them, broadly oblong, nearly 4 mm. long, 2 mm. wide toward the base, truncate at the base, rounded at apex, glabrous, creamy white, veiny, strongly reflexed in flower and early falling; stamens 4, apparently sterile, opposite the calyx segments, also glabrous; filaments 1 mm. long, thick, somewhat flattened; anthers about as long, ovately triangular, basifixed; ovary imbedded below the middle, the upper portion smooth; style usually 5 and more or less united, 1 mm. long, bearing brown capitate stigmas; fruit yellow glandular, ellipsoid, 4 mm. long, nearly 2 mm. wide across the top, hard, 3 or 4-celled, bearing the calyx segments and the divergent styles with stigmas, each cell with few to several ovules.

Typespecimen 10627 and 11524, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, May and August respectively, 1909.

The former number was collected on a forested mossy ridge at 7500 feet on mount Calelan; the latter at about the same elevation in shrubby woods along the Seriban creek on mount Apo.

Very near to *D. minor H. Br.* but apparently with different fruits.

MALPIGHIACEÆ

Hiptage cebuensis Elm. n. sp.

A sprawling and subscandent shrub; branches freely rebranched, quite slender, the brown twigs grayish brown lenticelled, young portion yellowish puberulent. Leaves opposite, scattered, chartaceous, glabrous, curing brown, folded on the upper sublucid side, the acute to acuminate apex recurved, the entire margins more or less rugulose, oblong, the mature larger blades 1 dm. long, 4 cm. wide across the middle or usually just below it, base obtuse to rounded or occasionally subcuneate; midvein prominent beneath, only in the young state with appressed hairs, with 5 ascendingly curved lateral

pairs, all reddish brown in the dry state, reticulations fine, quite evident from both sides but especially from the lower; petiole 1 cm. long, glaucous brown, glabrous, caniculate along the upper side. Inflorescence a spicate raceme, usually arising from the uppermost leaf axils, ascending, strict, rachis covered with fine yellowish appressed hairs, subtended at the base with similarly pubescent hairs, flower bearing from below the middle; pedicels divaricate, 1 cm. long, subtended by acuminate bracts not exceeding 2 mm. in length, minutely bracteate at the middle; calyx red, 2.5 mm. long, only the basal portion pubescent, the 5 lobes roundly obtuse at apex, with a circular disk-like gland on the upper basal portion; petals yellowish, delicate, subequal, 3.5 mm. long, distinctly clawed; the lamina rotund, denticulately margined or subentire, truncately rounded or cordate at the base; stamens, 10, all fertile; filaments free, unequal, the lower one very much longer, glabrous; anther 0.75 mm. long, rather broad, emarginate at both ends, basifixed; ovary bluntly 3-lobed, pubescent; style glabrous, arising from the middle apical portion of the ovary, glabrous, recurved, about as long as the longer filament; ripe fruit finely pubescent, 3-winged, the brown glabrous wings chartaceous, ovately oblong, obtusely rounded at apex, the middle one 15 mm. long or twice as long as the lateral pair.

Type specimen 12029, *A. D. E. Elmer*, Mualbual, Island of Cebu, October, 1909.

Gathered from limestone cliffs or outcroppings along the southwest coast of Cebu.

Allied to *H. luzonica Merr.*, but quite distinct in a number or characters.

VERBENACEÆ

Clerodendron williamsii Elm. n. sp.

A lax undershrub; stem 1.5 cm. thick, 2 m. high, sparingly branched, ascending, ends of branchlets suberect; wood sappy white, odorless and tasteless, breaking with a snap; bark greenish gray, smooth. Leaves clustered toward the ends of the twigs or stem, ascending, rotately spreading, flat, only

slightly recurved, submembranous, dull green above, much paler green or usually reddish beneath though with greenish veins, glabrous, usually opposite, exceedingly variable in size, the larger collected leaves 4 dm. long, 1.5 dm. wide above the middle, obovately oblong, apex broadly acute, the side above the middle with 1 to 3 large dentate lobes, otherwise entire, gradually narrowed from above the middle to the abrupt and obtusely rounded base, drying greenish brown; midvein very stout beneath, with 7 to 11 arcuate lateral pairs, reticulations coarse but quite evident; petiole also glabrous, subterete, 1 dm. long, dark green. Inflorescence paniculate, erect, 4 dm. long, 2 dm. wide at the base; peduncle usually solitary and 1 dm. long; branchlets reddish brown, branched from the middle, pulverulent, subtended by linear 5 mm. long green bracts; pedicel 1 cm. long, finely puberulent; calyx persistent, similar in vestiture, at most 1 cm. long; lobes nearly free or united about the base, the 4 segments reddish brown, oblong, sharply acuminate, the sides more or less wavy; corolla tube brick red, nearly 2 cm. long, obscurely puberulent on the outside; the 5 lobes subequal, oblong or subelliptic, 1 cm. long, "salmon" color; stamens as many, the exerted 2 cm. long, portion brick red, inserted upon the throat, glabrous; style similar in color, exceeding the stamens, sparsely pilose toward the slightly thickened base, bearing 2 rather pointed stigmatic arms; ovary subglobose, glabrous; fruits not seen.

Type specimen 11149, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, July, 1909.

A rare undershrub in stony soil of humid woods along streamlets near the Sibulan river at 1750 feet. Flowers very showy and pretty, but without odor. "Dibalai" is the Bagobo name. Dedicated to *Mr. R. S. Williams* who also collected it in the Zamboanga peninsula.

COMPOSITÆ

Vernonia florescens Elm. n. sp.

A rather small tree; stem 10 m. high, 3 dm. thick; branches chiefly toward the top and forming an elongated

dense crown, twigs suberect and with a dirty brown puberulence; wood soft, dingy white, without odor or taste; bark checked, more or less lenticelled on the branchlets. Leaves chartaceous, horizontally spreading, dark green and sublucid on the upper glabrous side, much lighter and short puberulent beneath, entire but with subinvolute dry margins, alternatingly scattered along the twigs, exceedingly variable in size, the larger blades 17.5 cm. long by 7.5 cm. wide above the middle, broadly rounded at the top, terminating with an abrupt acute point, base obtuse or broadly cuneate, occasionally rounded and inequilateral, obovately oblong, the smaller ones elliptish, drying brown; midvein quite prominently raised beneath, grayish puberulent especially along the sides; lateral nerves arcuate, 5 to 7 on each side, similar in vestiture, reticulations rather coarse and relatively prominent beneath; petiole up to 5 cm. long in the larger or lower leaves, when young covered with short crisp hairs, becoming glabrous, ascending. Inflorescence erect, broadly paniculate, 2 dm. long, fully as wide, the lowermost branches subtended by small leaves, the main branches branched from near the base, densely covered with short grayish brown crisp hairs, the ultimate branchlets divaricate and few to several-flowered toward the end or at least above the middle; pedicels nearly 5 mm. long, crisply pubescent, at the apex bearing a short and similarly pubescent bract; involucral bracts dark purple, numerous, imbricate, persistent and widely spreading; the basal ones scarcely longer than 1 mm., ovate, the back more or less pubescent; the inner ones 5 times as long, oblong to oblanceolate, subglabrous or only the margins finely ciliate; flowers about 6 in a head; corolla whitish toward the base, otherwise pink or light purple, 6 mm. long, glabrous, tubular, the 5 acuminate segments nearly 2 mm. long; stamens 5, inserted upon the middle of the tube; filaments filiform, glabrous, 1.25 mm. long, slightly wider at base, entirely free; anthers 2.5 mm. long, linear, acuminate, basifixed, sagitately tailed at the base, united; style of the same color, nearly 6 mm. long, glabrous, rather thick and fleshy, articulate at the base; stigmatic arms 3 mm. long, gradually tapering to a rather fine point, finely puberulent; young achenes 1.5 mm. long, truncately obovoid, compressed, with short scattered hairs

along the ridges; pappus 4 to 6 mm. long, equal, creamy white in the young state, finely scabrid.

Type specimen 11613, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, September, 1909.

Discovered in moist humus covered fertile soil of woods at 3500 feet of mount Calelan. It was also observed along the Sibulan and Baruring rivers at the same elevation. The Bagobos call it "Igmay". Its profuse purplish blue or pink flowers are seen from a long distance.

This species is not the same as *Elmer* 11289 from the same locality and which I take to be *V. arborea* (*Wall.*) *Ham.*

Vernonia apoense Elm. n. sp.

Slender erect tree; stem 10 m. high, 3 dm. thick, irregularly wadded toward the base; branches quite laxly rebranched above the middle, the twigs ascendingly curved, short yellowish brown puberulent or pubescent; wood rather hard, yellowish white, odorless and tasteless, quite heavy. Leaves subchartaceous, suberect, much paler beneath, tips recurved, quite numerously scattered along the branchlets, alternating mostly, curing brown, diverse in size, the larger blades 6 cm. long, 3 cm. wide across the middle, at the apex abruptly acute or acuminate, occasionally with a blunt tooth on each side where the apical constriction begins, base obtuse or rounded, occasionally inequilateral, the margins otherwise entire, elliptic to oblong, the smallest ones lanceolate, glabrous above except the midvein, beneath glandular and glabrous except the nerves; petiole slender, 1.25 cm. long, densely yellowish brown hairy along the upper side; midvein prominent, with 3 to 5 divaricate lateral ones whose tips are arched and united, reticulations rather fine and quite conspicuous on both sides. Inflorescence erect, paniculate, 1 dm. long, nearly as wide, short fulvous pubescent, the lower main branches arising from the uppermost leaf axils; the ultimate branches rather numerously flowered toward their distal ends; pedicels varying up to 3 mm. long and similarly pubescent; involucre 4 mm. long, subcylindric, 2 mm. thick, imbricate; the lower bracts ovate and pubescent on

the back, scarcely exceeding 1 mm. in length; the inner ones linear, 4 mm. long, glabrous except the finely ciliate margins; flowers about 3 in a head; achene frequently only 1 maturing in a head, usually 3, about 3 mm. long, 1.25 mm. thick, oblong in outline, subterete or flattened on the ventral side, truncate at apex, abruptly pointed at the base and with a knob-like base; pappus twice as long, copious, equal, finely scabrid, creamy white, at the base intermixed with short hyaline bristles.

Type specimen 10764, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, May, 1909.

Collected in a humid forested flat at 3750 feet. This the Bagobos also call "Igway". It was repeatedly noticed on forested ridges on mount Calelan at a higher elevation. *Elmer* 6695 from mount Mariveles is apparently the same. It was doubtfully referred to *V. arborea* (*Wall.*) *Ham.* by me and distributed under that name.

LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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A NEW GENUS AND NEW SPECIES OF LEGUMINOSAE

BY

A. D. E. ELMER

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Whitfordia Elm. n. gen.

Leaflets not glandular punctate, without stipellae; flowers of medium size, papilionaceous; anthers versatile, attached to the filaments usually a trifle below the middle; ovary 1-ovuled, without a disk; pods apparently becoming quite large and remaining indehiscent.

Not having mature fruit, it is hard to decide between *Dalbergieae* and *Galegeae*. Certain characters are suggestive of *Psoralia*. Dedicated to *Dr. H. N. Whitford*, Chief of Division of Investigation, Bureau of Forestry.

Whitfordia scandens Elm. n. sp.

A woody climber; stem terete, 3.5 cm. thick, flexible; branches mostly toward the top, divaricately spreading, tough, green, the twigs suberect and terminated by the inflorescence; wood soft, greenish, odorless and tasteless; bark gray and more or less lenticelled. Leaves alternating, upon short sub-

erect branchlets which are usually subtended by rigid persistent bracts; petiole with linear acute stipules less than 0.5 mm. long, 5 to 8 cm. long, terete, swollen at the base; leaflets coriaceous, mostly horizontal, folded upon the upper darker green side, with recurved tips, the basal pair usually smaller, 5, the rachis 1 to 1.5 cm. extended beyond the upper pair of leaves, usually opposite, occasionally the upper ones subopposite, oblong or the smaller ones ovately oblong, acute to acuminate, the apical point blunt, base subcuneate to obtuse or even rounded, the entire margins slightly involute in the dry state, diverse in size, the normal blades 1 dm. long, 4 cm. wide across the middle; pedicels falling with the blades, without stipule-like bracts, thickened, rugose in the dry state, 7.5 mm. long; nerves equally prominent on both sides, the midvein prominent beneath, the 4 to 5 lateral pairs very oblique, the reticulations quite evident from both sides. Inflorescence 3 to 5 dm. long, racemosely paniculate, terminal; central axis stout, terete, branched from near the base, ascendingly curved, densely puberulent; branchlets averaging 1 dm. long, short ferruginous pubescent, sharply angled in the dry state at least, unbranched, usually curved, yellowish green in the fresh state, subtended by a pair of sharply acuminate or spinose bracts; buds numerous, quite dense, subtended by rather broad and abruptly pointed tips, very early falling; flowers deciduous, odorless, scattered all along the branches, usually in subwhorls, provided on each side with lanceolate acuminate bracteoles which also fall off early; calyx sericeous tomentose, upon 1 to 2 mm. long pedicels, 5 mm. long, fully as wide across the oblique top, the basal tooth obtuse, the lateral ones acute, the uppermost one quite broad and notched at the apex, all nearly of the same length, thick and reddish in color; corolla deep crimson red excepting the more or less united claws and the dull yellow central or middle region of the banner; banner reflexed, ovately oval, 12.5 mm. wide, 17.5 mm. long including the 4 mm. long claw, entire or shallowly emarginate at the apex, the base abruptly running into the claw, puberulent on the dorsal side especially along the median line; wings nearly equalling the banner, inequally hastate at the abrupt base, free, glabrous, the lamina oblong and with a rounded apex;

keels equal in length, united with their claws and along the median line above the middle, puberulent on the back and toward the apex, the upper basal portion with a large squarrose sagittate lobe, apex broad and either shallowly bifid or minutely apiculate; fertile stamens 9, glabrous, 12.5 mm. long; the basal two thirds of the filaments united except along the upper side, whitish, the free portion subequal in length; anthers ellipsoid, 1.5 mm. long, minutely bifid at the base and basiufixe dehiscent through longitudinal slits; vexillary stamen free, sterile, shorter than the fertile ones, glabrous; ovary hairy, 1-ovuled, gradually tapering into the 3.5 mm. long thick similarly hairy stipe; style as long as the stipe, hairy except at the erect glabrous apical portion; stigma minutely capitate; young pods 3 cm. long, one half as wide, subsessile, abruptly pointed, nearly 7.5 mm. thick, hard, canescently velvety, 1-seeded.

Type specimen 12259, *A. D. E. Elmer*, Magallanes (Mt. Giting-giting), Province of Capiz, Island of Sibuyan, April, 1910.

A tough woody climber and sprawling over thickets and trees along the Patoo river at 500 feet. The native Visayan on Sibuyan call it "Cagay" and eat the beans.

BAUHINIA Linn.

Bauhinia hallieriana Elm. n. sp.

A usually subscandent and sprawling shrub; stem flexible, 3 to 5 cm. thick, subterete; branches widely sprawling, quite slender, smooth, glaucous green, wiry, the young portions densely fulvous pubescent; wood odorless, bitter, whitish with yellowish streaks; stem bark brown, roughened with minute lenticels. Leaves submembranous, slightly descending, glaucous green beneath, folded upon the upper side, alternatingly scattered along the subglaucous branchlets, diverse in size, broadly elliptic in outline, the larger blades 7.5 cm. long, and as wide across the middle, usually turning brown while drying, entire, shallowly cordate at the base, the lobes roundly obtuse or nearly rounded at the apex, their sides curved especially the outer, the sharp sinus reaching to the middle of the blade, glabrous; nerves 9, digitately spreading from

the base of the leaf, the middle one terminating in the sinus, prominent beneath, the secondary ones and cross bars faint; petiole glabrous or the young ones toward the base short hairy; subglabrous and subglaucous, somewhat thickened at both ends; stipules yellowish green pubescent on both sides, rather thin, roundly lunate, 2.5 mm. long. Inflorescence erect, terminal, quite heavy and more or less succulent, the racemes 1 to 2 dm. long, rachis angular, short brown pubescent; pedicels ascending, 3.5 cm. long, usually with a pair of linear bracts near the middle, puberulent; the subtending bracts thin, caducous, sharply acuminate, pubescent on both sides; calyx also finely pubescent on the outside, 1 cm. long, 5 mm. thick, its 5 segments subequal, the longer one 2 cm. in length, oblong, 5 mm. wide, terminated by a sharp abrupt point, reflexed in anthesis; petals free, white, when old turning yellow, the middle outside portion short pubescent; banner ovately elliptish, 1.5 cm. long, with a 4 mm. long claw; keel nearly as long and similar in shape; wings toward the constricted base subauriculate; stamens usually only 3 fertile, the others reduced to staminodes; filaments pinkish, also turning yellow, free, glabrous, the longer ones 2.5 cm. long, quite thick toward the base, apex finely pointed; anthers creamy white, versatile, purplish on the back, 1 cm. long, 4 mm. wide, obscurely bifid at the widest basal portion; ovary linear, silky, grayish white, hairy, gradually tapering toward the stipe and into the style which bears a very thick green capitate stigma; pod flat, rigid, 2.5 cm. wide, 2 dm. long, pendulous, brown.

Type specimen 12172, *A. D. E. Elmer*, Romblon, March, 1910.

Common in shale or sandstone soil of shrubberies in all grass land gulches. Also on the north side of Sibuyan island. Its flowers are sweetly fragrant and the natives call it "Bica-bica". Dedicated to *Dr. Hans Hallier* who also collected it on Romblon in 1904.

The fulvous twigs and inflorence, coupled with the differently shaped calyx tube and petals serve to mark it distinct from *B. subglabra Merr.*

ALBIZZIA Durazz

Albizzia magallanensis Elm. n. sp.

A medium sized tree; stem 5 dm. thick, 10 m. high; the main branches arising above the middle, crookedly rebranched, forming a dense flattened crown; wood soft, odorless and tasteless, the sapwood whitish, the central portion very dark brown; bark mottled, smoothish or roughened with lenticels, the twigs glabrous and greenish. Leaves alternate, ascending, spreading, 3 dm. long; rachis smooth or only lenticelled toward the base, the very young ones slightly hairy, 9-pinnate; petiole averaging 5 cm. long, much thickened at the base; rachilla slender, subglabrous, ascendingly curved, 1 dm. long, bearing 25 pairs of leaflets, the lowermost are somewhat reduced and extend nearly to the base; leaflets submembranous, flat, ascending, glaucous green beneath, dull darker green on the upper surface, glabrous, 12.5 mm. long, 4 mm. wide, entire, oblong elliptic, both ends rounded, the base truncately so, sessile, the upper side blackish in the dry state, green beneath; their midvein in evidence from both sides, with a pair of much ascending lateral nerves from the base; short petiolules thickened and usually bearing a pair of glands on the upper side; stipules not seen. Inflorescence terminal or from the uppermost leaf axils, solitary or 2 or 3 from the same twig, ascendingly curved, spicate, 5 to 8 dm. long; stalk green, striate in the dry state, sprinkled with white lenticels especially toward the base, abruptly terminating, flower bearing toward the top only, occasionally with a dwarfed leaf at about the middle, terete, 7.5 mm. thick; secondary stalks in small clusters, mostly ascending, strict, 3 cm. long, puberulent in the flowering state, subtended at the base by short irregularly shaped bracts; flowers umbellately clustered at the end, delicate, odorless; calyx greenish, more tubular than funnel-shaped, 4 mm. long, 3 mm. wide across the 5-denticulate top, puberulent; corolla whitish, 7.5 mm. long, tubular except the inflated upper portion; segments nearly equal, 2 mm. long, triangularly acute, subglabrous or finely puberulent; stamens indefinite, monodelphous; filaments whitish, slender, glabrous, at least twice as long as the

corolla, unequal in length, curved and interlaced above the middle; anther 0.25 mm. long, 0.5 mm. wide, early falling; ovary glabrous, stipitate, extended into a slender glabrous whitish style; pods not seen.

Type specimen 12089, *A. D. E. Elmer*, Magallanes (Mt. Giting-giting), Province of Capiz, Island of Sibuyan, March, 1910.

A nice appearing tree occasionally scattered in fertile well drained soil of woods bordering grass lands at 750 feet.

Very near to *A. pedicellata Bak.* from Malacca, but leaflets smaller and slightly differently shaped, rachises and leaflets not downy, the latter not at all obtuse.

PITHECOLOBIUM Mart.

Pithecolobium apoense Elm. n. sp.

Erect tree; trunk 10 m. high, nearly 8 dm. thick; main branches arising from above the middle, comparatively short and crookedly rebranched; wood coarsely grained, odorless, tasteless or nearly so, moderately hard, white on the outside, otherwise molasses brown; bark yellowish or grayish on the branches, obscurely lenticelled on the stem. Leaves chartaceous, horizontal or descending, usually concave on the lower lighter green side, the obtusely rounded apex slightly recurved, alternate, few scattered toward the end of the branchlets, with two pairs of leaflets or doubly bipinnate, obtuse or subcuneate at the base, margins entire, drying brown on both sides, obovately elliptic or merely elliptic, glabrous, diverse in size, the lower pair usually smaller, the terminal pair 2.5 dm. long, 12 cm. wide a trifle above the middle; petioles less than 3 cm. long, glabrous, usually shorter than the internodes; petiolules much thickened, 5 mm. long, also glabrous; nerves prominent beneath, only sparsely hairy, the 7 oblique lateral ones reticulately united at their ends, the reticulations quite evident on both sides. Inflorescence clustered along the branchlets; stalks green, varying from 5 to 9 cm. long, branched from below the middle; branchlets divaricate, 1 to 5 cm. long, sparingly rebranched, fulvous pubescent in the flowering state; flowers

clustered at the ends only; calyx light green, sessile, turbinate, 4 mm. long, 2.5 mm. wide at the top, subglabrous; teeth 5, shallowly rounded, fulvous ciliate along the margins; corolla creamy white, odorless, 7.5 mm. long, tubular below the middle, glabrous except the finely ciliate margins of the segments; lobes 5, equal, 3.5 mm. long, oblong, obtuse to acute at the apex; stamens numerous, monodelphous, also creamy white, nearly twice as long as the corolla; filaments glabrous, curved and interlaced above the middle; anthers similarly white, 0.25 mm. long, 0.5 mm. wide, truncate at both ends; ovary glabrous, stipitate, terminated by a very slender glabrous style which bears a small stigma; pods not seen.

Type specimen 11710, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, September, 1909.

A slender tree in moist fertile soil of a densely forested flat on the trail to Apo near Mainit creek at 4000 feet. The Bagobos call it "Magat-carot".

Very distinct from *P. scutiferum* (*Blco.*) *Benth.*

GLEDITSCHIA Linn.

Gleditschia copelandii Elm. n. sp.

A medium sized tree; stem 6 dm. thick, 15 m. high; main branches arising from the middle, numerously rebranched ultimately, crooked with relatively short twigs; wood moderately hard, dingy white with a reddish center, bitterish, odorless; bark relatively thick, lenticelled, mottled, reddish brown beneath the epidermis. Leaves alternate, copious, more or less scattered along the branchlets, pinnate; rachis puberulent, 3 to 5 cm. long; leaflets 4 to 6 pairs, flat, ascending, lucid above, of the same dark green on both sides, sessile, glabrous, drying greenish, subchartaceous, varying from 1.5 to 2.5 cm. long, from 5 to 7.5 mm. wide a trifle below the middle, inequilateral, the upper margin straight from below the middle to the notched unequally lobed apex, base cuneate, the upper basal portion also straight and subparallel with the usually gray rachis, entire; midvein equally prominent on both sides, strict, glabrous, the faint lateral ones reticu-

late. Inflorescence terminal and leaf opposed or from the uppermost leaf axils, short recemose, suberect, in the bud state enclosed by striate glabrous brown imbricated bracts which soon fall off; central axis 1 or more cm. long, densely fulvous pubescent; pedicels 1 cm. long, similarly hairy, dull white, subtended by small bracteoles; flowers creamy white except the yellow anthers, slightly fragrant; calyx of 4 nearly equal segments; segments submembranous, deflexed, free, 3.5 mm. long, lanceolately oblong, with a midvein and lateral reticulations, subglabrous or only sparsely pilose on the middle dorsal side; corolla segments 5, also free, similarly veiny, entirely glabrous, deflexed; keels 5 mm. long, 1.5 mm. wide, oblong, acute at apex; wings smaller, substipitate, similar in shape; banner shorter than the wings, oblanceolate or subspatulate; stamens 8, the upper one sterile and with a much shorter filament, free; filaments naked, unequal in length, the longer ones 9 mm. long, usually curved above the middle; anthers versatile, ellipsoid, 1 mm. long; ovary densely fulvous; style subterete, nearly 5 mm. long, glabrous, terminated by a small capitate stigma; fruits not seen.

Type specimen 12234, *A. D. E. Elmer*, Magallanes (Mt. Giting-giting), Province of Capiz, Island of Sibuyan, April, 1910.

A fine entirely spineless tree even so in the young state, inhabiting moist fertile wooded flats at 750 feet along the Patoo river. Dedicated to *Dr. E. B. Copeland*, Dean of the School of Agriculture, Philippines University.

Very distinct from *G. rolfei Vid.*, the only heretofore known Philippine species.

STRONGYLODON Vog.

Strongylodon mindanaensis Elm. n. sp.

Scandent upon lofty trees; stem terete, 3 to 5 cm. thick, flexible; branches scattered, the green slender twigs drooping; wood soft, porous, white, distinctly sweet; bark very thick, brown and smoothish on the outside, otherwise whitish, that on the branches yellowish gray mottled and more or less lenticelled. Leaves subchartaceous, similarly dull green on

both sides, glabrous, folded upon the upper side, the acute to acuminate apex recurved, margins entire, rounded or subtruncate at the base, alternate, the larger blades 1.5 dm. long, 7.5 cm. wide across the middle or a trifle below this, the terminal one usually a trifle larger and with equal sides, tne upper side of the sessile lateral ones narrower and straighter; petiole ascending, thickened and twisted at the base, glabrous, 7.5 cm. long, terete; terminal petiolule 1 cm. long, pedicels about as long; midvein conspicuously raised on the lower side, with 7 to 9 ascendingly curved lateral pairs, the reticulations quite prominent beneath, all glabrous; stipules not observed. Inflorescent spike lateral or from the leaf axils, solitary or few-clustered, 1 dm. long; rachis dark green, stout, terete, smooth, short branched from near the base; branchlets similar in color, ascending, promiscuously scattered, less than 1 cm. in length; pedicels 1.5 cm. long, slender, glabrous, falling with the flowers and leaving large scars, pale green, suberect; calyx pale green, glabrous, 7.5 mm. long, 5 mm. wide across the top, purplish striate, apex truncate, only obscurely lobed or toothed at the rim; petals 5, blue or purplish toward the base, free; banner 3 cm. long at least, nearly 1 cm. wide, abruptly but gradually tapering at the base to the claw, oblong, apex acute or obtuse, dark blue or rather purplish striate; wings 12.5 mm. long, 5 mm. across, much curved and rounded at the apex, at the base with a broad lobe and abruptly constricted into the very slender claw; this claw appears to be united to those of the keels and is usually pubescent along the upper side; keels proper broadly lanceolate, united, the sharply acuminate point tubular and usually contain the stamens, falcate from the side, as long as the banner, abruptly tapering into the 6 mm. long claw; stamens diadelphous, glabrous except the exerted portion which is usually puberulent; filaments subequal, the one beneath the reflexed banner the shortest; stamens oblong, longer than 1 mm.; ovary short tomentose, upon a long curved tomentose stipe, bearing a very slender glabrous style; fruit not observed.

Type specimen 11818, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, September, 1909.

Near the Mainit creek at 4000 feet, in very humid

forests on the trail to Apo. Only observed once during my six month's stay in the woods. The Bagobos call it "Lipe".

Differentiated from *S. coerulea Merr.* by the much shorter and thinner spikes; by the finer pedicels, longer calyx and other floral characters.

SPATHOLOBUS Hassk.

Spatholobus apoensis Elm. n. sp.

Scandent; stem 3 to 5 cm. thick, terete, more or less flexible, looping; branches toward the top only, slender, the free portions hanging, otherwise forming interlaced masses; wood soft, odorless and tasteless, yellowish especially toward the center; bark grayish brown, smooth or only sparsely lenticelled. Leaves alternating, scattered along the branchlets; petiole 5 to 8 cm long, ascendingly curved from the base, in the young state short brown pubescent or only puberulent, ultimately glabrous, 1 to 3 cm. extended beyond the lateral pair of leaves; petiolule thickened, similarly pubescent, falling with the blade, subtended by mere vestiges of bracts; leaflets 3, entire, descending, folded upon the glabrous upper slightly darker green surface, drying brown, sublucid on both sides but especially on the upper, very minutely puberulent on the upper as well as on the lower side, diverse in size, the lateral pair usually smaller, elliptic or the smaller ones ovately so, the larger blades 15 cm. long, 9 cm. wide across the middle, apex short obtuse, base broadly obtuse or rounded; midvein prominent beneath, as are also the 7 to 9 ascending lateral pairs, more or less puberulent, reticulations quite evident. Panicle terminal and from the uppermost leaf axils, profuse, yellowish strigose pubescent, 3 to 5 or even 8 dm. long; main branches slender, widely spreading, alternate, usually branched from near the base, subtended by a pair of rigid deflexed 5 mm. long bracts; the bracts of the secondary branches triangular and acute, those subtending the pedicels short and subsetaceous; pedicels 2 mm. long, densely ferruginous pubescent; calyx campanulate, 4 mm. long, nearly 3 mm. wide across the top, subglabrous, distinctly stipitate at the base, apex entire or

the lower with the lateral sides very indistinctly dentate, rather thick; corolla white except the pink margins, half fleshy; banner 7.5 mm. long, nearly as wide above the middle, clawed at the base, broadly obovate and emarginate at the apex; wings fully as long, gradually tapering into a longer claw, the lamina oblong and with a rounded apex; keels also free except toward the apex, the lamina similar in shape but the claw slenderer, nearly 2 mm. shorter; stamens 10, the longer ones 6 mm. in length, the upper vexillary one shortest and only united with the others at the base; filaments glabrous, united for over one half their length, the free portion subequal in length; anthers elliptic, bifid at the base, 1 mm. long, dehiscent longitudinally, attached to the connective which terminates in a rather conspicuous point; ovary subsessile, 3 mm. long, gradually terminating into the 3 mm. long style which is glabrous obove the middle and bearing a minute terminal stigma, subtended at the base by glands; young fruits falcate, flattened, widened toward the apex where they usually contain a solitary seed.

Type specimen 11795, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, September, 1909.

A lofty and powerful climber in a moist, fertile, densely forested basin at 4000 feet, south of the Baruring river. The Bagobo name is "Balia".

Some doubt exists as to its rightful genus, and it may prove an entirely new one when the nature of the fruits are known.

DALBERGIA Linn.

Dalbergia ferruginea daronensis Elm. n. var.

The habit, foliage and flowers are almost exactly as in *D. ferruginea Roxb.* The chief difference, therefore, is only in the fruit which has fewer seeds, is acute at the apex and cuneate at the base, not rounded at both ends, nor upon as slender a stipe as in typical specimens.

Type specimen 11030, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, June, 1909.

Sprawling over shrubberies in gulches of the cogon formation at 1000 feet. The Bagobos call it "Balintodok".

Possibly this is *D. luzonensis Vog.* I have seen no fruiting specimens from the Philippines which can with safety and accuracy be classed identical with those from Celebes.

Dalbergia davaoensis Elm. n. sp.

Tree; stem 10 m. high, 4 dm. thick, crooked and subterete; branches mostly above the middle, crookedly rebranched, rigid, widely spreading and forming a flattish crown; wood moderately hard, gnarly, whitish with minute reddish streaks; bark thick, gray, scaling in plates, yellow beneath the epidermis. Leaves alternatingly scattered along the more or less pubescent young twigs; rachis strigosely fulvous, 1.5 dm. long, ascending or horizontally spreading; leaflets likewise alternate, submembranous, dull green above, horizontally spreading, paler or subglaucous beneath, oblong elliptic, the average ones 3 cm. long, one half as wide across the middle, rounded at the apex, base obtuse or rounded, occasionally subcuneate, with appressed fulvous hairs on both sides; petioles 3 to 5 mm. long, similar pubescent; midvein prominent beneath, the lateral ones very obscure and about 10 to 15 on each side, the faint reticulations more evident on the upper surface. Inflorescence ascending, 5 to 8 cm. long, axillary, branched from the middle, the peduncle tomentose; branchlets slender, divaricately spreading, densely covered with a fuliginously colored matrix; pedicels 2 mm. long; calyx 3 mm. long, turbinate, the outside similarly pubescent, the lower tooth much longer and acuminately pointed, the lateral one acute to obtuse and quite short, the upper one broadly rounded; petals blue; banner ovately rotund, abruptly constricted into the stipe, apex entire or notched, the lamina 1 cm. long; wings and keels about the same size, equally stipitate, the wings with a small auricle at the base and their apices rounded, the keels more or less united along the lower sides and apices acute; stamens 10, all fertile; filaments in 2 groups of 5 each, united two-thirds the length, the ascendingly curved free ends subequal; anthers 0.25 mm. long, a trifle wider; ovary hairy, upon a slender pilose stipe, terminated by a

slender glabrous style which bears a minute capitate stigma; pods flat, 5 to 8 cm. long, 10 to 15 mm. wide, smooth, base abruptly short stipitate, apex obtusely rounded, 3 to 5-seeded, pendulous, yellowish green and in the region of the beans slightly streaked with red.

Type specimen 11925 in fruit and 10551 in flower, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, October and May respectively, 1909.

An uncommon tree in well drained soil of woods on sharp ridges or on edges of very steep gorges along the Sibulan river at 2500 to 3500 feet. The Bagobos call it "Balbalan" and "Caranaipate".

Next to *D. minahassae Koord.*, but the leaflets are more villous pubescent, not ovate oblong nor obtuse or emarginate, their bases obtuse rather than cuneate; inflorescence densely tomentose not puberulent; and corolla blue not white. The fruits are different from the so determined middle Luzon specimens.

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LEAFLETS OF PHILIPPINE BOTANY

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LAURACEAE FROM MT. APO AND MT. GITING-GITING

BY

A. D. E. ELMER

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BEILSCHMIEDIA Nees

Beilschmiedia purpurea Elm. n. sp.

A burly appearing tree; stem 10 m. high, 4.5 cm. thick, with its crooked and rigid main branches mainly toward the top; twigs relatively short, also rigid, suberect; wood odorless, bitter, the sapwood yellow, dark brown toward the center, moderately hard and burly; bark light gray, smooth or peeling in small irregular dry plates, thick, yellowish beneath the epidermis, light or yellowish gray on the branchlets. Leaves crowded at the ends, spreading, descending mostly, curved and strongly conduplicate on the upper lucid and darker green surface, upon ascending petioles, thinly coriaceous, curing dull brown, glabrous, alternate or subopposite, entire, obtuse to acute at the recurved apex, base cuneate to broadly obtuse, oblong or frequently ovately oblong, 16 cm. long and 6 cm. wide in the average blades; petiole brown, glabrous, 1 cm. long, midrib prominent, with 7 to 9 lateral pairs, reticulations quite prominent especially on the lower side; bud bracts glabrous,

5 mm. long, dark brown or nearly black in the dry state. Inflorescence ascending, also glabrous, similarly discoloring while drying, short branched above the middle, all the stalks turning to a shining deep red; flowers usually 2 to 3-clustered at the ends of the ultimate branchlets, subrecurved, yellowish green; calyx also glabrous, stipitately tapering toward the base, about 5 mm. long; segments quite thick, 6, equal or occasionally one smaller on the outside, ovately rotund, nearly 2 mm. long, finely puberulent along the margins; the outer 6 fertile stamens opposite the segments and with introrse anthers; the inner series of 3 anther bearing stamens alternating with 3 spatulate staminodes, all of the 3 inner series fertile; the anthers of the 3 fertile inner series extrorse but not as fully developed as the outer ones, their filaments bearing large rugose glands on each side; anthers 2-celled, truncate; filaments flattened, very short, hairy, almost as wide as the inner 3 anthers; ovary ovoidly fusiform, 2 mm. long, with a short style, glabrous; fruit not seen.

Type specimen 11288, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, August, 1909.

Inhabiting a wooded bench bordering grassy glens and on the edge of a deep ravine at 2750 feet. The native Bagobo name is "Magansirar".

In general appearance *Dehaasia triandra Merr.*, but flowers not at all as described in that species.

CINNAMOMUM Blm.

Cinnamomum mercadoi Vid.

Field-note:—Tree 50 feet high, with a 2 feet thick bole; wood soft, white and with yellowish streaks, with a strong green cinnamon odor, light, tasteless; bark comparatively thick, gray, rigid; young twigs green; leaves chartaceous, darker green on the upper curvingly conduplicate side; inflorescence terminal and subterminal, ascending or erect, yellowish or pale green; flowers slightly odorous, of the same color as the stalks except the deeper yellow anthers. "Caningag" is the Bagobo name. As soon as the tree was cut a sweet aromatic odor was detected and soon afterwards the woods in that vicinity were filled with it.

Represented by number 10473, *Elmer*, Todaya (Mt. Apo), Mindanao, May, 1909.

Cinnamomum mindanaense Elm. n. sp.

A medium sized tree; stem 10 m. high and 3 dm. thick, straight, terete, usually branched from below the middle; main branches ascending, freely branched and ultimately numerously rebranched, forming a dense elongated crown; twigs lax, slender, somewhat drooping, smooth and green, dark brown or blackish in the dry state; wood moderately hard, whitish throughout, odorless and tasteless; bark very smooth throughout, finely mottled with grayish brown and whitish blotches on the epidermis, otherwise cinnamon brown and similar in taste, readily separating into small slabs, nearly 1.5 cm. thick on the stem, only one half as thick on the larger branches. Leaves opposite or subopposite, scattered along the twigs, the average blades 1 dm. long by 3 cm. wide across the middle or a trifle below it, entire, glabrous, ascendingly spreading, rather numerous, recurved especially toward the acute or acuminate apices, curvingly conduplicate on the upper dark green and semilucid surface, subglaucous beneath, base obtuse or acute and frequently inequilateral, oblong or the smaller ones lanceolate; petiole less than 1 cm. long, frequently only one half as long, brown in the dry state, glabrous; bud bracts cinereous, 4 mm. long; midrid straight clear into the apex, its basal lateral pair arising some distance above the base and extending two thirds the length of the blade, the 1 to 3 secondary lateral pairs arising from above the middle and very obscure. Inflorescence divaricate or ascending, averaging 15 cm. long or less, all the stalks smooth and yellowish green, terminal or from the uppermost leaf axils, sparingly branched from beneath the middle; secondary branches only occasionally rebranched, slender, divaricate, bearing at their ends 1 to 2 or even 3 flowers; pedicels similar, 6 to 9 mm. long; perianth in anthesis 6 mm. long, glabrous, the basal one third united and turbinate; its segments 6, equal, 3 5 mm. long, 2.75 mm. wide, oblong, roundly obtuse at apex, very finely ciliate at least along the margins, veiny in the middle region, glandularly

dotted; stamens 12, without glands or even without staminodes, in 2 series opposite the perianth segments; filaments of the outer 6 nearly 2 mm. long, flattened, finely ciliate at the base, those of the inner series less than one half as long; anthers of the outer ones introrse, 4-celled, the lower cells larger, lids hanging from the upper ends, 1.25 mm. long, basifixed, truncate at both ends; the inner 6 anthers ovate in outline, only the lower 2 cells present and lateral, hardly extrorse; ovary glabrous, 1.5 mm. long, ellipsoid; style 1 mm. longer, also glabrous, bearing a much enlarged pulverulent stigma; fruits obovately ellipsoid, lucid green with minute whitish spots, when mature shining steel blue and truly ellipsoid, 1.25 cm. long, 7.5 mm. across the middle.

Type specimen 11105, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, July, 1909.

Collected in open shrubberies of light woods in fertile rather well drained soil at 1500 feet. About a dozen trees were seen scattered on the plateau along the Sibulan river. The Bagobos call it "Kami" and used to barter its bark with the Chinese traders at Santa Cruz.

CRYPTOCARYA Brown

Cryptocarya everettii navesii Elm. n. var.

Differing from the type mainly in the following characters. Leaves averaging narrower, not so extremely inequal in size, more pubescent beneath, about 7-nerved only, gradually not abruptly tapering at the apex, cross bars and reticulations much less pronounced beneath, inflorescence also more densely pubescent or tomentose.

Field-note:—Small erect tree, in moist gravelly soil along wooded banks of the Patoo river at 750 feet; stem 5 inches thick, terete, 15 feet high at least; branches mainly above the middle, divaricate, slender, repeatedly branched; wood soft, dingy or yellowish white, odorless and tasteless; bark smoothish, yellowish brown; leaves horizontal or descending, rigidly coriaceous or subchartaceous, flat and with tips recurved, dark green above, much lighter green beneath; panicle erect, terminal, yellowish green; perianth segments 6; stamens 9,

fertile and with 6 glands, the outer row of 6 introrse and alternating with the glands, the central series of 3 with extrorse anthers.

Type specimen 12505, *A. D. E. Elmer*, Magallanes (Mt. Giting-giting), Province of Capiz, Island of Sibuyan, May, 1910. Named after *Andreas Naves*, an Augustinian priest and botanist.

Cryptocarya calelanensis Elm. n. sp.

Erect tree; stem 6 dm. thick, 15 m. high; its main branches arising from above the middle, ascending, ultimately numerously branched and spreading; wood moderately soft or hard, burly, white, tasteless, with a faint pepper green odor; bark thick, reddish brown beneath the brown epidermis, gray and sparsely lenticelled on the branches. Leaves coriaceous, horizontal or descending, dull green on the upper shallowly folded side, much lighter green or yellowish so beneath, turning brown when dry, glabrous, alternatingly scattered along the branchlets, oblong or ovately oblong, 12 cm. long, 5 cm. wide across the middle or below it, the acuminate tips usually recurved, the entire margins slightly turned upon the under side in the dry state, base obtuse or subrotund or occasionally inequilaterally acute, the midrib with about 5 ascending lateral pairs, the reticulations obscure; petiole 1.5 cm. long, glabrous. Flowers not seen; infrutescent stalks yellowish, suberect, 6 to 10 cm. long or much shorter, glabrous, occasionally short branched above the middle; fruits very dark green, ellipsoid, 1 cm. long, 7 mm. thick across the middle, abruptly constricted into a distinct basal stalk, short conical toward the apex, the circular apex with a short mucronate point.

Type specimen 11160, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, September, 1909.

This fine tree was discovered in rich humus covered soil at 3750 feet on mount Calelan in a moist densely forested flat. This also the Bagobos call "Mabara-an".

Cryptocarya subvelutina Elm. n. sp.

A medium sized tree; stem 10 m. high, 3 dm. thick, branched above the middle; wood moderately hard, reddish

white, odorless and tasteless; bark grayish brown, smooth or obscurely lenticelled, dark reddish brown beneath the epidermis; branches freely rebranched, ascending, the ultimate ones rather numerous, slender, green, olivaceous puberulent, more or less drooping. Leaves ovately oblong or the smaller ones broadly lanceolate, copious, alternatingly scattered along the branchlets, the larger blades 1 dm. long, nearly 5 cm. wide below the middle, broadly rounded and inequilateral at the base, horizontal or descending, bright lucid green on the upper shallowly conduplicate side, glaucescent on the under subvelutinous surface, thinly coriaceous, the upper glabrous side very dark brown in the dry state, the entire margins subinvolute, the apical one half gradually tapering into the acute or acuminate point; midrib pronounced on the lower side, with 3 to 5 pairs of ascendingly arched lateral nerves, cross bars relatively faint; petiole 5 to 10 mm. long, densely olivaceous puberulent or pubescent. Inflorescence greenish, axillary, ascending, 3 to 5 cm. long, cymosely branched from below the middle, similarly pubescent; branchlets rather thin, mostly flowered toward their ends; flowers sessile, erect, yellowish green; calyx 3 mm. long, hairy, the lower one half turbinate; segments 1.5 mm. long, 6, equal or nearly so, rather thick; stamens 9 to 12 with glands about the middle; outer anthers 2-celled and introrse, triangular, the inner ones apparently sterile, a trifle larger, auriculately lobed at the base, slenderly acute; filaments flattened, short, more or less hairy; pistils present; fruit ovoidly globose, 6 mm. thick, bearing at the apex a crown of short cinereously pubescent segments, otherwise subglabrous, greenish.

Type specimen 11737, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, September, 1909.

Of this only one tree was seen in good well drained soil of a lightly forested ridge at 3500 feet, south of the Baruring river. The Bagobos call it "Magolumog".

C. glauca Merr., but leaves thinner, always broadest below the middle, with fewer nerves; inflorescence not profuse, axillary, not exceeding the foliage. Its leaves are however similar to *C. pallida Merr.*, but fruits very dissimilar.

Cryptocarya todayensis Elm. n. sp.

A tall tree; stem 25 m. high, nearly 1 m. thick, terete, straight; its main branches widely spreading toward the top, numerously rebranched toward the ends and forming dense masses; the twigs green, blackish and angular in the dry state, short cinnamon brown puberulent on the young twigs but soon wearing glabrous; wood moderately hard, pale white or somewhat yellowish, odorless, bitterish, rather nice to work; bark smooth, brown lenticelled, thick, reddish beneath the epidermis. Leaves descending, submembranous, shining lucid green on the upper curvingly conduplicate side, acuminate or subcaudate, tips recurved and usually curved to one side, beneath glaucous, the young leaves light or yellowish green, glabrous, numerous, alternate, scattered along the branchlets, blades 8 cm. long, 3 cm. wide across the middle or below it, margins entire and faintly involute in the brown dry state, oblong to ovately oblong or the smaller blades broadly lanceolate, base abruptly cuneate or obtusely rounded and usually inequilateral; petiole less than 1 cm. long, brown, when young finely puberulent; midrib prominent beneath, the main lateral pair arising 5 mm. from the base and extending two thirds the length of the blade, with 1 or 2 minor pairs arising from above the middle, reticulations faint. Inflorescence terminal or terminating lateral branchlets, suberect, 5 to 8 cm. long, branched from near the base or from the middle, densely olivaceous puberulent, the branchlets rather short; flowers sessile or subsessile, subtended by 1 mm. long pubescent bracts; calyx 3 mm long, punctate, short hairy on the outside, the basal one third turbinate; segments 6, equal, 1.5 mm. long, ovate; stamens 9, fertile, the outer 6 introrse, apparently the middle series of 3 extrorse and with glandular appendages on their sides, the inner series of 3 with large ovately acuminate and apparently sterile anthers; filaments short, flattened, more or less hairy; anthers triangularly ovate, 2-celled; pistil glabrous; ovary elongate ellipsoid; style 1.25 mm. long, bearing an irregularly lobed or rugose stigma; fruit not seen.

Type specimens 10713 and 11919, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, May and October respectively, 1909.

A splendid tree in moist soil of a humid forested basin at 3250 feet, along the trail from Todaya to Talon. "Capingan" is the Bagobo name given for both specimens.

Apparently its nearest affinity is *C. ilocano Vid.*, but not at all that species.

Cryptocarya glauciphylla Elm. n. sp.

A medium sized tree; stem 4.5 dm. thick, 13 m. high; main branches crooked, chiefly above the middle, ultimately numerously rebranched, the suberect numerous twigs dull velvety brown, olivaceous puberulent and striate in the dry state; wood whitish, odorless and tasteless, light, more or less burly; bark mottled, smoothish or finely checked. Leaves numerous, alternatingly scattered, at first with an extremely fine puberulence on both sides but soon becoming glabrous, thinly coriaceous, mostly descending, dull green on the upper folded surface, glaucous beneath, even in the dry state, the larger blades 1.5 dm. long, 4 cm. wide below the middle, ovately oblong or broadly lanceolate, entire, most of them gradually tapering to the slender caudate apex, base rounded or obtuse; midrib prominent and yellowish green beneath, becoming brown when dry; lateral veins 5 to 7 on each side, oblique, reticulations fine and very faint; petiole 1 cm. long, caniculate on the upper side, similar in vestiture. Infrutescence about 5 cm. long, shortly branched above the middle, from the uppermost leaf axils or subterminal, ascending, olivaceous puberulent; fruit flattish globose, subglabrous, dark green, 8 mm. across, with a circularly truncate apex.

Type specimen 12287, *A. D. E. Elmer*, Magallanes (Mt. Giting-giting), Province of Capiz, Island of Sibuyan, April, 1910.

Found in reddish soil with a gravelly subsoil of wooded banks along the Pauala river at 750 feet. "Magatopoy" is the local Visayan name.

This may be considered a variety or even a form of *C. acuminata Merr.*, but leaves on our specimens profuse, on the whole much narrower and tips slenderly caudate.

DEHAASIA Blm.

Dehaasia triandra Merr.

Field-note for 12221:—Erect tree, in damp rich soil of a forested flat near the Pauala river at 1000 feet; branches mostly at the top and forming a flat crown, freely rebranched, the twigs crooked and suberect; wood bitter and slightly fetid, soft, yellow, light; bark yellowish brown and gray on the branchlets, smoothish or lenticelled and scaling in very thin small plates; leaves submembranous, horizontal, recurved, shallowly folded on the upper side, dull dark green above, paler so beneath; young inflorescence suberect, green; fruits ellipsoid, 1 inch long, upon a deep bright red receptacle usually provided with few lenticels; the thick brown peduncle only an inch or few in length, sparingly branched. "Bulabog" is the Visayan name for the former number and "Betis" for the latter.

Represented by numbers 12221 and 12261, *Elmer*, Magallanes (Mt. Giting-giting), Sibuyan, April, 1910.

ENDIANDRA Brown

Endiandra vidalii Elm. n. sp.

Stunted tree; stem 10 m. high, 4 dm. thick, crooked, with the main branches arising from the middle; wood hard and heavy, without odor or taste, brownish toward the center; bark 15 mm. thick, hard, rigid and brittle, gray mottled, densely lenticelled, cinnamon brown beneath the epidermis; branchlets numerous, lax, yellowish gray and brown lenticelled. Leaves usually horizontally spreading, alternate, scattered along the twigs, glabrous, coriaceous or subchartaceous, shallowly folded upon the upper lucid green surface, subglaucous green beneath even in the dry long, state, tips acute to acuminate and recurved, entire, 13 cm. at least 4 cm. wide across the middle or a trifle below it, base obtusely rounded or abruptly acute and occasionally slightly inequilateral; midrib prominent and brown beneath, impressed along the upper side, with 6 to 9 pairs of oblique

lateral ones, cross bars and reticulations quite obscure; petiole stout, dark brown in the dry state, 1 cm. long or longer, the upper grooved side frequently glaucous. Flowers not seen; infrutescence terminal or subterminal, 15 cm. long, sparingly branched from the middle; the branches stout, woody, lenticelled, usually upwardly curved; fruit sessile, at least 2.5 cm. long, ovately fusiform from the side view, hard, heavy, coal black, shining, containing a solitary seed of 2 cotyledones.

Type specimen 12131, *A. D. E. Elmer*, Magallanes (Mt. Giting-giting), Province of Capiz, Island of Sibuyan, March, 1910.

This hardwood tree was collected in moist clayey soil of the wooded banks along the Pauala river at 750 feet. Named in honor of *D. Sebastian Vidal y Soler*, a distinguished botanist.

It has the exact foliage of typical *Cryptocarya acuminata Merr.*, but with entirely different fruits. Compare the leaves with *C. glauciphylla Elm.* which was collected one month later and no more than a few rods lower down the river.

Endiandra gitingensis Elm. n. sp.

Tree of medium size; stem nearly 3 dm. thick, 10 m. high; its main branches toward the top only, divided into many branchlets, the ultimate ones suberect and with their tips of a fine olivaceous appressed puberulence; wood soft, yellowish white, tasteless, with a distinct lead-pencil odor, light; bark mottled, smoothish, deep brown beneath the epidermis. Leaves alternatingly crowded toward the ends of the branchlets, ascending or horizontally spreading, coriaceous, glabrous, dull green above, a trifle paler beneath, drying brown, nearly flat or shallowly folded upon the upper side, oblong, entire, the normal ones 1 dm. long, 4 cm. wide across the middle, frequently much smaller, apex acute, base cuneate, conspicuously reticulate on both sides; midrib prominent, grooved along the upper side, with rather faint 7 to 9 lateral pairs whose tips are more or less arched and united; petiole 7.5 mm. long, stout, caniculate on the upper side, when young finely puberulent, otherwise glabrous. Flowers not seen; fruits upon solitary or few-branched 2 cm. long, stalks, ellipsoid, 2.5 cm. long, shining deep green and hard, the mature ones purplish black with a subglaucous bloom

which easily rubs off, the inner portion of the exocarp green, the single seed with 2 cotyledones, reddish on the outside, its meat white and with a few viscid brown convolutions, with a strong rather pleasant odor.

Type specimen 12420, *A. D. E. Elmer*, Magallanes (Mt. Giting-giting), Province of Capiz, Island of Sibuyan, May, 1910.

Discovered along cliffs of the Pauala river at 1750 feet, near the base of the numerous waterfalls from Giting-giting or fingered summit peaks. "Maye-mayebas" is the Visayan name.

ITEADAPHNE Blm.

Iteadaphne philippinense Elm. n. sp.

Large tree; stem 25 m. high, at least 1 m. thick; main branches arising from above the middle, the branches crookedly rebranched; twigs numerous, bendable, erect, comparatively short, roughened by the old leaf scars, yellowish gray except the green very young tips; wood moderately soft, yellowish, streaked with brown, odorless but with a slight bitter taste; bark brown, gray on the larger branches, thick, scaling in thin plates, reddish brown beneath the epidermis. Leaves more or less grouped in whorls, copious, ascending, rigidly coriaceous, pale green above, glaucous beneath, frequently twisted toward the obtuse or acute and slightly recurved tips, obtuse or cuneate at the base which is occasionally slightly inequilateral, glabrous, the entire margin subinvolute, quite inequal in size, the medium ones 5 to 8 cm. long, 2.5 cm. wide across the middle or slightly above it, oblong or oblongish to oblanceolate, the upper lucid side leather brown in the dry state; midvein brown and conspicuous beneath, impressed on the upper side, the divaricate 5 to 7 lateral pairs obscure and with their ends reticulately united; petiole 0.75 to 1.5 cm. long, glabrous, dark brown when dry; bud bracts 4 mm. long, rigid, glabrous or only the margins finely puberulent, deeply folded upon the upper side. Inflorescence asising from the uppermost leaf axils, ascending, 3 to 5 cm. long, short paniculately branched especially toward

the top; main stalk stout, glabrous as are also the secondary ones, reddish; flowers erect, upon nearly 5 mm. long glabrous pedicels; the outer 3 perianth segments greenish, oblong, 3.5 mm. long, 2 mm. wide, glabrous; the inner 3 whitish on the woolly inner side, yellowish white on the glabrous outer side, a trifle larger, obovately oblong, all united toward the base; fertile stamens 6; filaments compressed, 2 mm. long, bearded along the upper side; anthers 1 mm. long, oblong, truncate at both ends, introrse, 2-celled, laterally dehiscent, the lid hanging from the upper end; the inner series much shorter, sterile, usually attached to the lateral basal sides of the inner series of the fertile filaments; ovary glabrous, 1.5 mm. long, elongate conical, bearing an equally long style; stigma finely puberulent; fruit ascending, upon 2 cm. long stalks, its pedicel much thickened and warty, globose except for the tip which is slightly pointed, lucid purplish brown or black, 2 cm. thick.

Type specimen 11493, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, August, 1909.

Collected on a ridge in the great mount Apo forested basin at 6000 feet. "Boga" is the Bagobo name.

Its affinity is right next to *I. confusa Blm.* from Java and Sumatra but twigs always glabrous and never slender, the under side of leaves never puberulent or sericeous.

LINDERA Thunb.

Lindera apoensis Elm. n. sp.

Slender tree, 10 to 15 m. high, with a 3 dm. thick stem; main branches only at the top, long and slender, divaricate or the shorter terminal ones oblique; its branchlets relatively short and thin, not rebranched, dark green or brownish, ascendingly curved, glabrous or olivaceous puberulent toward the tips, obscurely angled and roughened by the old leaf scars; wood doty and brownish white, odorless and tasteless, very soft; bark grayish, smoothish or obscurely checked. Leaves evenly scattered all along the twigs, ascending, recurved toward the tip, coriaceous, sublucid on the upper nearly flat surface, much paler green

beneath, drying brown, alternate, the younger ones evenly covered beneath with a short appressed olivaceous pubescence, ultimately becoming glabrous, the average blade 1 dm. long, 4 cm. wide across the middle, acute to acuminate, rounded at the base, entire; petiole 2 mm. long, glabrous or in the young state olivaceous puberulent, caniculate along the upper side; midvein prominent beneath, with 7 to 9 lateral ascendingly curved pairs, reticulations coarse and obscure. Inflorescence axillary, ascending, racemosely spicate; rachis 1.5 cm. long, appressed yellowish brown pubescent, angular; pedicels or secondary branches divaricate, 5 mm. long, similarly pubescent, subtended by very brief bracts or none; flowers 7 to 9 in each head; involucral bracts globose in the bud state, 3 mm. across, early falling, imbricate, the outer more or less pubescent on the high convex side, the inner ones a trifle smaller and glabrous, rotund, finely punctate glandular; pedicels proper 2 mm. long, hairy; perianth of about 4 to 6 lobes which are more or less unequal in length, the basal one third united, glabrous or the dorsal basal portion hairy, the longer ones 2 mm. in the length, 6 fertile and 6 sterile; filaments of the outer or fertile series 0.33 mm. long, glabrous; anthers introrse 2-celled, laterally dehiscent, 0.75 mm. long, broadly truncate at the apex, obscurely tapering into the filament at the base; the inner ones much shorter, the entire short filaments surrounded by the light yellow rugose glands; pistillode not seen; fruits not known.

Type specimen 11640, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, September, 1909.

Discovered in fertile humid forests at 4000 feet. The tree has a very characteristic appearance by the abrupt termination of its bole and slender divaricate main branches which bear rather numerous and relatively short branchlets. Quite distinct from the general aspect of *Litsea* trees in the same locality. The Bagobos call it "Sarerab".

LITSEA Lam.

Litsea perrottetii (Blm.) Vil.

Field-note:—A 55 feet high tree, on a dry forested ridge

at 1500 feet, along the Baracatan creek; stem 2 feet thick, crooked, only branched toward the top; wood soft, yellowish throughout, odorless and tasteless; bark smooth, grayish white; branches crooked and widely spreading; the branchlets green, smooth; leaves thinly coriaceous, recurvingly descending, lucid dark green on the upper conduplicate surface, much lighter green beneath; the petiole and prominent veins beneath yellowish green; infrutescence ascending, from the uppermost leaf axils; stalks a few inches long or even 0.5 foot, yellowish green, the calyx deeper green; fruits green with white spots especially toward the apex, when mature dark wine color, oblong elliptish, less than 0.5 inch long. "Katel" is the native Bagobo name.

Represented by number 10961, *Elmer*, Todaya (Mt. Apo), Mindanao, June, 1909.

Litsea membranacea Elm.

Field-note:—A small erect tree, on nearly precipitous flanks of the Baruring river at 3000 feet; stem 20 feet high, 5 inches thick, with few rather short branches at the top; the branches forming a flat crown, subverticillately branched; bark smooth, brown, gray on the branches; wood soft, yellowish, light, odorless but with a bitterish taste; leaves chartaceous, horizontally spreading, upon ascending grayish petioles, much lighter green beneath, the nerves yellowish, only shallowly conduplicate on the upper surface; fruits clustered along the rather thick branchlets, upon short woody tubercles; nuts shallowly set in upon the calyx, broadly ellipsoid, 1 inch long, 0.75 inch thick, turning pale yellow prior to becoming dark crimson red, thinly checked, upon short thick stalks. "Mabara-an" is the vernacular Bagobo name.

Represented by number 10811, *Elmer*, Todaya (Mt. Apo), Mindanao, June, 1909.

Litsea tayabensis Elm.

Field-note:—Small tree, 15 to 25 feet high, with a 7 inches thick stem, in low interlaced woods at 7500 feet of mount Apo; bark dull brown, roughened with wart-like

excrescences; wood soft, yellowish, light, without odor or taste; branches spreading, soft brown pubescent; leaves coriaceous, also in whorls, characteristically descending, shining deep green above, glaucescently green beneath, the veins yellowish green, the edges above the middle more or less wavy and with a twisted apex, recurved, otherwise flat; fruits upon short rigid stalks on the second or third year old branchlets, globose, shining green, then bright yellow and when falling bright red and 0.75 inch in diameter. Again this is known to the Bagobos as "Mabara-an".

Represented by number 11526, *Elmer*, Todaya (Mt. Apo), Mindanao, August, 1909.

Can this be a species of *Neolitsea?*

Litsea quercoides Elm.

Field-note for 10687:—Tree, 25 feet high, in a somewhat swampy region of dense woods south of the Baruring river at 3500 feet; branches spreading, mostly at the top; wood very soft, yellowish throughout; bark smooth, mottled; leaves rigid, thick, ascending, slightly conduplicate on the upper shining green surface, glaucous green beneath; petioles strongly curved; fruits young, clustered along the twigs, upon short thick brown stalks 1 inch long, the basal portion somewhat flattened, obpyriform, more or less lenticelled; nuts entirely enclosed in the yellowish green calyces. Both of these specimens the Bagobos call "Mabara-an".

Represented by numbers 10678 and 11247, *Elmer*, Todaya (Mt. Apo), Mindanao, July and May respectively, 1909.

Litsea philippinensis Merr.

Field-note:—A medium sized tree, in gravelly or stony soil of moist woods along the Sinuban creek at 750 feet; stem 40 feet high, 1.5 foot thick, branched toward the top only; wood soft, yellowish, tasteless, of an unpleasant sourish odor, light; bark smoothish, grayish mottled; branches forming a widely spreading flat crown, with suberect twigs; leaves chartaceous, mostly ascending, flat or the sides curved upon the upper dull deeper green surface, with yellowish veins

beneath; fruits clustered along the rather slender branchlets, upon 0.5 inch long and thick rufous brown stalks, spreading; cup green or becoming scurfy brown with age, 0.5 inch deep, as wide across the top; nuts fully 1 inch long, olive green, with minute white spots, more tapering toward the nipple-shaped apex. "Balelad" is the local Visayan name.

Represented by number 12193, *Elmer*, Magallanes (Mt. Giting-giting), Sibuyan, April, 1910.

Litsea fulva (Blm.) Vil.

Field-note:—An erect shrub-like tree, in compact well drained soil of shrubberies bordering grassy glens at 500 feet; stem 16 feet high, 5 inches thick; branches divaricate, from below the middle, slender, rebranched; wood soft, yellowish, with neither odor nor taste; bark smooth, dark brown or blotched with gray; leaves coriaceous or subchartaceous, tips only recurved, flat, ascending or horizontal, shining deep green above, subglaucescent beneath; infrutescence in small clusters along the branchlets, subglobose or a trifle thicker above the middle, less than 0.5 inch thick, pale yellow but ultimately turning shining red; the saucer-shaped calyx green and persistent after the nuts have fallen.

Represented by number 12118, *Elmer*, Magallanes (Mt. Giting-giting), Sibuyan, March, 1910.

Litsea griseola Elm.

Field-note:—Tree, 30 to 40 feet high, in damp soil of the forested basin at 4000 feet; trunk 1.5 foot thick; wood soft, yellowish throughout, odorless and tasteless; bark thick, reddish, yellowish just beneath the thinly checked grayish brown epidermis; limbs rather long, few and thick; leaves 1 to 3 feet long, but on some other trees much smaller, descendingly recurved, rigid, curvingly conduplicate on the upper side, glaucescent beneath, mostly crowded toward the ends of the twigs, obscurely arranged in yearly subwhorls, the internodes covered with leaf-like bracts; inflorescence ascending, upon 3 to 5 inches long stalks from the lower leaf axils or from the axils of their scars; the flowers yellowish, somewhat

odorous. The foliaceous strongly curved bracts of the twigs and inflorescence inhabited by numerous small brown ants. "Gofa" is the name given to it by the Bagobo.

Inflorescence ascending, 6 to 10 cm. long, from the lower leaf axils or from the axils of their scars; rachis angular, with a fine appressed puberulence, stout, strict, abruptly terminating, its pedicels never exceeding 1 cm. in length and subtended by 1 cm. long bracts; involucral bracts about 4, short tomentulose as are also the bracts, broadly elliptic, 6 to 8 mm. long; flowers yellowish, somewhat odorous, several in a head; perianth 7 mm. long, the basal 4 mm. stipitately tapering, usually 5-segmented; segments oblong, obtusely rounded at apex, hairy on the back as well as the tube, about 3 mm. long; staminodes many, with or without much thickened lateral glands, the short stalks usually somewhat hairy, the outer ones filiform; pistil glabrous, 3 mm. long, the ovary ellipsoid and gradually extending into the 1.5 mm. long neck.

Represented by number 10470, *Elmer*, Todaya (Mt. Apo), Mindanao, May, 1909.

Litsea baruringensis Elm. n. sp.

A medium sized tree; stem 10 m. high at least, 3 dm. thick; branches mostly toward the top, few, comparatively short, crookedly rebranched; twigs dull green or soon turning brownish on the upper side, entirely glabrous; wood soft, yellowish with black streaks, odorless and tasteless. Leaves alternatingly scattered along the branchlets, descending, chartaceous, folded on the upper deeper green surface, glabrous, the entire margins somewhat wavy, the acute to acuminate apex occasionally subfalcate and always recurved, curing dull brown, base rounded or obtuse and slightly inequilateral, nearly 2 dm. long and 5 to 8 cm. wide across the middle, beneath paler green or glaucescent, oblong; midrib yellowish green, brown when dry, conspicuous beneath, with 11 to 13 ascending lateral pairs, the tips of the lateral ones strongly arched, reticulations coarse and faint; petiole glabrous, stout, 2 cm. long or less; bud bracts 5 mm. long, grayish brown, subglabrous, acute. Peduncle 6 mm. long, strict, puberulent, at the base subtended by conspicuous scars fringed

with soft fine hairs; involucral bracts 4, decussately imbricate, oval, deeply concave, 6 mm. long, densely puberulent on the outer sides, punctate; flowers about 7 in a head, the 3 mm. long basal portion fleshy, trubinate, densely pubescent; segments 8, oblong or obovately so, pubescent on the back, ciliate along the margins, 2 mm. long; staminodes numerous, hairy especially toward the more or less thickened bases, usually curved and clavate at the apices, the inner ones as well as the outer ones provided with glands toward the bases of the filaments; pistil conspicuous, fleshy, only minutely hairy, ovary 1.25 mm. long, neck nearly 2 mm. long; stigma an irregularly lobed disk; infrutescence clustered along the twigs or in the leaf axils, upon short lenticelled stalks, their pedicels about 1 cm. long; calyx cup yellowish, thick, nearly flat, at least 1.5 cm. wide across the top, constricted into a 1.5 cm. long stalk; nuts or fruits of a rich deep red when mature, globosely flattened, 2 cm. across, umbellately clustered upon short thick axillary stalks less than 5 mm. long.

Type specimens 11736 in flower and 10738 in fruit, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, September and May respectively, 1909.

Both of these numbers were collected in loose stony soil of woods on a steep slope along the Baruring river at 3500 feet. "Mabara-an" is their Bagobo name.

Litsea baracatanensis Elm. n. sp.

A medium sized tree; stem 3 dm. thick, 10 m. high or higher, terete but not straight; main branches toward the top, the branchlets crooked, the twigs green and slightly ascending, the young portion only sparsely puberulent; wood moderately soft, dirty yellowish throughout, odorless, bitter; bark very smooth, grayish mottled. Leaves alternatingly crowded toward the end of the branchlets, horizontally spreading, glabrous, curvingly conduplicate on the upper shining rich green surface, much paler green beneath, the entire margins slightly thickened, in the dry state greenish on the upper side and pale underneath, frequently the entire blade slightly curved especially so toward the acute or acuminate

apex, the sides inequilateral and the cuneate bases usually unequally sided, 2 dm. long without the petioles, 7 cm. wide across the middle but often smaller, obovately oblong or oblong, subchartaceous; petiole 2.5 cm. long, stout, glabrous, nearly black when dry, yellowish green when fresh; midrib brown and very prominent beneath, with 9 oblique lateral pairs whose tips are reticulately united, the coarse cross bars beneath rather faint, the upper surface finely reticulate; bud bracts densely cinereous, 5 mm. long, acute or acuminate. Inflorescence sparse, usually beneath the foliage or from the lowermost leaf axils; peduncle usually solitary, divaricate, averaging 1.5 mm. long, subglabrous, bearing at the apex few to several secondary peduncles; these are usually a few mm. shorter, yellowish gray puberulent, subtended at the base by dense short hairs; involucral bracts decussately imbricate, leathery, subrotund, veiny, deeply convex, the outer side very finely light yellowish puberulent, numerously punctate, at least 6 mm. across; flowers several in a head or more, upon 2 mm. long and rather thick pedicels, soft pubescent; perianth segments few, linearly or obovately oblong, 2 5 mm. long, hairy at the base and along the edges toward it; stamens at least 12 besides the short stipitate obovoidly rugose inner ones; filaments slender, 2.5 mm. long, the inner ones slightly shorter, light yellowish brown hairy; outer anthers introrse, 4-celled, the cell lids attached to the upper end of the cells, 1 mm. long, basifixed, truncately rounded at both ends, the inner series also introrse but somewhat abortive; ovary glabrous, elongate ellipsoid; fruit not seen.

Type specimen 10993, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, June, 1909.

Collected in dry fertile soil of a forested ravine along the Baracatan creek and at the upper edge of the cogon formation at 1500 feet. The Bagobos call it "Tioh". Only one tree was observed.

Litsea segregata Elm. n. sp.

Erect tree, with a 10 m. high and 2.5 dm. thick stem; branches spreading from above the middle and forming an

elongated crown, the twigs angular; wood slightly yellowish white, with dark brown spots throughout, light in weight, odorless and tasteless; bark brown, smooth except the lenticels, grayish on the twigs. Leaves alternatingly scattered along the slender branchlets, glabrous, ascending, coriaceous, shining smooth on the upper side, much paler beneath; nearly flat or curvingly conduplicate on the upper side, the entire margins subinvolute, drying dark brown on both sides, obovately oblong or merely oblong, obtuse to acute at apex, obtuse or subcuneate at base, 14 cm. long and 5 cm. wide a trifle above the middle; petiole yellowish or whitish green, nearly back when dry, glabrous, shallowly caniculate along the upper side, upwardly curved, 1.5 cm. long; midrib prominent, with 7 to 9 ascendingly arched lateral pairs, all smooth and dark brown, the cross bars very faint. Flowers not seen; fruits clustered upon short and thick stalks, sessile or upon 5 mm. long stout pedicels; calyx brown, scarcely more than 3 mm. high, 8 mm. across the thinly edged rim, the basal two thirds constricted; nuts 2 cm. long, ovoid, hard and pale green with milk colored spots, ultimately dark red and turning to a dark wine color, its stone brown, the epidermis rather fleshy.

Type specimen 10534, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, May, 1909.

Only one tree was discovered in fertile soil of woods on Angats' knoll at 3500 feet or higher. The tree was loaded with fruits so that some of its branchlets were entirely concealed by them. The fruits on the same branch varied from dark to pale green and bright red to a dull deep wine color. Very pretty! "Mabara-an" is the native Bagobo name.

Quite similar to *L. sibuyanensis Elm.*, but leaves with fewer nerves, twigs yellowish gray and angular, not in the least pubescent at their tips. It cannot be referred to my numbers previously distributed under *L. luzonica (Blm.) Vil.*

Litsea caesifolia Elm. n. sp.

Slender erect 5 m. high tree; twigs lax, horizontally spreading, greenish, drying nearly black, glabrous; wood odorless and with bitterish taste, rather soft, yellowish with

brown streaks; bark mottled, warty toward the top and along the branches. Leaves nearly flat, horizontally spreading, chartaceous, dull green above, yellowish so beneath or caesius in the dry state, alternatingly scattered, narrowly oblong or broadly oblanceolate, entire, commonly 2 dm. long by 6 cm. wide across the middle, cuneate at the base, apex normally acute to acuminate, only occasionally obtuse, glabrous; midrib prominent beneath, glabrous, nearly black when dry, with 7 to 11 lateral ascendingly curved pairs whose tips toward the apex plainly interarch; reticulations obscure beneath, very fine and quite evident on the upper side; petiole 1 cm. long or longer, glabrous, similar in color when dry; bud bract 5 mm. long, finely fulvous pubescent on the outside. Flowers not seen; fruits axillary or along the twigs, 1 to 3 or even more clustered, the short thick stalks only sparingly rebranched; calyx cup yellowish green, rugose, with scattered brown lenticels, 1.5 cm. long, the basal one half constricted into a stout pedicel, nearly as wide across the thin rim; mature fruit or nut very deep wine red, globosely flattened at both ends, 2.5 cm. across, smooth and shining.

Type specimen 10853, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, June, 1909.

Collected on a dry wooded ridge of rather fertile compact soil at 3250 feet, south of the Baruring river. "Mabara-an" is the Bagobo name. Only one tree was observed during my several month's collecting.

Leaves exactly as in *L. penangiana Hook.*, but fruits differently shaped and at least twice as large.

Litsea perfulva Elm. n. sp.

A medium sized tree, 15 to 20 m. high, about 8 dm. thick; branches crooked and widely spreading toward the top, twigs suberect, the apical portion densely fulvous; wood heavy, hard, burly, yellowish, bitter and with a slight greenish odor; bark brown, checked, reddish beneath the outer layer. Leaves usually alternate, scattered, ovately oblong to broadly lanceolate, the entire margins subinvolute in the dry state, unequal in size, glabrous and conduplicate on the upper side, beneath short but densely fulvous tomentose, as-

cending, the acute or acuminate tips slightly recurved, dark shining green above, subglaucescent beneath, the veins yellowish green, the medium blades 13 cm. long, nearly 6 cm. wide across the middle or a trifle below it, frequently much smaller, base obtuse or subrounded; midrib very prominent beneath, with 5 to 8 ascendingly arched lateral pairs, the coarse reticulations quite evident, all densely covered with a fine fulvous tomentum; petiole 1 to 1.5 cm. long, stout, also fulvous; bud bracts a few mm. long, similar in vestiture. Inflorescence spicately racemose, axillary, ascending, from a few to 5 cm. long, densely fulvous, flower bearing or occasionally branched from below the middle; peduncles divaricately spreading, nearly 1 cm. long, subtended by acute 3 mm. long bracts which soon fall off; involucral bracts about 6, the outer 2 or 3 larger and nearly 4 mm. long, subrotund or the inner ones narrower, all fulvous pubescent on both sides; flowers usually 4 in a head, short stipitate, the perianth similar in vestiture; fertile stamens 9, with 4-celled introrse anthers; filaments hairy at the base, the shorter inner ones alternating with short stipitate rugose glands; pistillode present; young fruits ovoidly ellipsoid, with a mucronate point, one half imbedded in the calyx cup, 7 mm. long; cup rather deep, its margin quite thin, the basal one third constricted into astalk, 8 mm. across the middle, at least 10 mm. high.

Type specimen 10691, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, May, 1909.

Twice seen in a dense humid forested basin along the Baruring river at 3750 feet or more. "Baga" is the local Bagobo name.

Quite distinct from all other Philippine species and apparently it belongs in the section *Cylicodaphne*.

Litsea sibuyanensis Elm. n. sp.

A slender tree; stem 3 dm. thick, 12 m. high, terete, rather crooked; branches mostly toward the top, horizontally spreading, the twigs ascendingly curved, their young tips soft fulvous pubescent; wood tasteless and odorless, soft, yellowish white; bark smooth, mottled. Leaves ascending, alternate, chiefly toward the ends of the branchlets, glabrous, shallowly folded upon the upper side, much paler

or glaucous green beneath, rigidly coriaceous, drying dark brown or dull steel blue beneath, the larger blades 13 cm. long, nearly 5 cm. wide across the middle, the entire margins subinvolute in the dry state at least, apex obtuse, base cuneate to obtuse; midrib prominently raised beneath, grooved above, in the young state thinly covered with a tomentum especially along the upper side, glabrous otherwise, with 9 to 11 ascending lateral pairs, their tips arcuate but scarcely united, reddish brown as is also the midrib, cross bars rather numerous and quite in evidence; petiole 1.5 to 2 cm. long, yellowish tomentose especially along the upper side, soon becoming glabrous; bud bract 5 mm. long, densely pubescent with light fulvous brown hairs. Inflorescence in small fascicles, in the lowermost leaf axils or in the axils of their scars; peduncle 1 to 1.5 cm. long, finely yellowish gray pubescent, subtended at the base by very short brown bracts which are densely pubescent; involucral bracts subrotund, about 5, deeply concave, 5 mm. long, imbricate, the outer or the exposed sides with fine crisp hairs and edges glabrous, the inner ones sericeous on the back and ciliate on the margins; flowers about 5 in each head, subsessile or in full anthesis stipitate; perianth segments linear lanceolate, varying from 1.5 to 2.5 mm. long, united at the base, long ciliate along the margins; stamens with 9 fertile and a sterile series; filaments rather thick and crinked in the bud state, slender, 7 mm. long, long ciliate especially toward the base, spreading and interlaced, at the base intermixed with numerous yellowish brown hairs, the inner series alternating with short stipitate rugose glands; fertile anthers all introrse, 4-celled, truncate at both ends, equal in shape and size, 1.25 mm. wide and 1.75 mm. long, the lower cells larger and more lateral, the lids attached to the upper end of the pockets; pistillode glabrous; ovary subellipsoid; style 2 mm. long, bearing a papillate stigma; fruit not seen.

Type specimen 12536, *A. D. E. Elmer*, Magallanes (Mt. Giting-giting), Province of Capiz, Island of Sibuyan, May, 1910.

Collected in moist rocky soil of densely wooded banks of the Sinuban creek at 750 feet. Only once seen.

It differs in a number of obvious characters from *L. philippinensis Merr.*

NEOLITSEA (Benth.) Merr.

Neolitsea villosa (Blm.) Merr.

Field-note:—A small shrub-like tree, in dense woods along a ridge at 4000 feet of mount Calelan; stem 12 feet high, a few inches thick; smooth bark mottled; wood soft, somewhat yellowish white, odorless and tasteless; branches mainly at the top, rigid and crookedly rebranched; leaves ascendingly whorled, flat or when old their sides strongly subcurved, rigidly coriaceous, shining green on the upper dull green surface, glaucescent beneath; fruits in small clusters from the fallen leaf axils along the twigs, set into thick sessile brownish green calyces; nut globose, fully 0.5 inch thick, green but begining to turn yellow from the apex. "Mabara-an" is the Bagobo name for it.

Represented by number 10796, *Elmer*, Todaya (Mt. Apo), Mindanao, May, 1909.

Neolitsea vidalii Merr.

Field-note for 10963:—Slender tree, 35 feet high, with an 8 inches thick stem, in fertile soil of dry woods on the edge of the Baracatan creek at 1500 feet; branches above the middle, forming an elongated crown; wood softish, odorless and tasteless, yellowish; bark smooth, mottled; branchlets crooked, rather slender, twigs green; leaves always in whorls, scattered along the branchlets, upon ascending petioles, radially spreading, curvingly conduplicate on the upper side, glaucous green beneath, the margins wavy; fruits clustered in the lower leaf axils or along the branches, stalks and cup yellowish green; nuts green, spotted with white dots, turning yellowish at the apex. The Bagobos call the former number "Mabara-an". The Visayan the latter number "Salingwak".

Represented by number 10963, *Elmer*, Todaya (Mt. Apo), Mindanao, June, 1909. Also number 12409, *Elmer*, Magallanes (Mt. Giting-giting), Sibuyan, May, 1910.

Neolitsea apoensis Elm. n. sp.

A small tree; stem 4 m. high, 8 cm. thick; branches mainly above the middle, laxly spreading, the ultimate tips erect or ascending, densely covered with an umber brown tomentum; wood odorless and tasteless, rather soft, yellow; bark smooth, mostly brown. Leaves ascendingly spreading, whorled as are also the twigs, chartaceous, of a rich shining green on the upper side except the midrib, glaucescent and glabrous beneath except the midrib, mostly flat or only slightly recurved, the average blades 1 dm. long by 3 cm. wide across the middle or a trifle above it, the entire margins minutely involute in the dry state, the upper surface brown when dry, obtuse or occasionally acutish at the apex, base subcuneate or acute, oblong or more obovately oblong; midrib prominent beneath and tomentose toward the base and along the upper impressed side; lateral nerves 7 to 10 on each side, ascendingly arched, their tips usually united, cross bars very faint; petiole 1 cm. long, densely tomentose, becoming glabrate especially along the upper side; bud bract 4 mm. long, brown, pubescent on the outer side. Flowers not seen; infrutescence scattered along the branchlets, in sessile clusters or solitary; fruit yellow, 2 cm. long, obovoid, set upon a thick rounded calyx rim, nearly 1 cm. across at the top and which at the base is abruptly constricted into a very short stalk.

Type specimen 11255, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, August, 1909.

This slender tree was discovered on a moist forested ridge at 3500 feet of mount Calelan. The vernacular Bagobo name is "Mabara-an".

Not *N. villosa (Blm.) Merr.* because of obtuse not acuminate leaves which are less pubescent and have more numerous lateral nerves. Also distinct from *N. intermedia Elm.*

PHOEBE Nees

Phoebe sterculioides (Elm.) Merr.

Field-note:—A 40 to 60 feet high tree, in dense moist forests north of the Baruring river at 3750 feet; branches

crooked and widely spreading toward the top; wood heavy, hard, burly, yellowish, bitter and with a sort of similar odor; bark brown, checked, reddish beneath the outer layer; twigs suberect, not numerous; leaves mostly at the ends of the branchlets, ascending, slightly recurved on the upper dark shining green surface, beneath subglaucescent, the veins yellowish green; inflorescence ascending, 6 inches to 2 feet long; main peduncles solitary or several, all branched chiefly above the middle; peduncles, pedicels and calyx yellowish green; corolla none or composed of the inner 3 free perianth segments; stamens 9, with 6 glands, the outer 6 stamens with introrse anthers, the middle series of light yellow glands which alternate with the outer series of 6 stamens; all anthers 4-celled, the inner stamens with extrorse anthers; ovary whitish, style greenish, stigma brown. "Boga" is the Bagobo name.

Represented by number 10685, *Elmer*, Todaya (Mt. Apo), Mindanao, May, 1909.

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LEAFLETS OF PHILIPPINE BOTANY

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THE GENUS SOLANUM FROM MOUNT APO

BY

A. D. E. ELMER

—o—

In the vicinity of mount Apo are at least six species of *Solanum*, more in number of species and representing a greater diversity in habit than in any other locality in our Archipelago. The list here presented is interesting, not only on account of the four novelties, but also because of the extreme habits these few species assume. With the exception of one lowland species, they are all alpine and all are ligneous. *S. crassipetalum Wall.* is a low ligneous or subherbaceous plant; *S. verbascifolium Linn.* and *S. apoense Elm.* are erect shrubs; *S. angatii Elm.* is an epiphyte; *S. manucaling Elm.* is a tree; and *S. lianoides Elm.* is a lofty tree climber.

SOLANUM Linn.

Solanum verbascifolium Linn.

Field-note:—Erect shrub, 4 m. high, 1 dm. thick; branches comparatively few and widely spreading; wood moderately soft, dingy white, covered with yellowish bark; leaves descending, submembranous, deeper green above, easily wilting; infrutescence erect, the fruits dark green when

collected. Gathered in fertile soil of light woods at 1250 feet. A widely distributed lowland species. "Casungog" is the native or Bagobo name.

Represented by number 11940, *Elmer*, Todaya (Mt. Apo), Mindanao, October, 1909.

Solanum crassipetalum Wall.

Field-note:—Erect, suffrutescent perennial; stem branched from near the base, 10 to 15 dm. high; the branches crookedly rebranched and widely spreading; wood soft, whitish, with a green pith; bark greenish, covered with yellowish gray lenticels; leaves ascending or horizontal, flat, lucid dark green above, much paler beneath, thinly coriaceous, turning blackish while drying; pedicels and calyx green; petals white; anthers yellow, with brownish tips; style also whitish, bearing a green stigma; globose fruit less than 1.25 cm. in diameter, turning to a dark shining red when mature. Collected in wet gravelly soil along the Cati creek at 6000 feet on the northeast side of Apo. The Bagobos call it "Boti".

Represented by number 11576, *Elmer*, Todaya (Mt. Apo), Mindanao, August, 1909.

Solanum apoense Elm. n. sp.

Slender shrub or tree-like; stem 4 m. high, 5 to 8 cm. thick, branched from above the middle; branchlets glabrous, dark brown or nearly black in the dry state, finely ridged longitudinally. Leaves opposite, widely scattering, not numerous, glabrous, submembranous, drying dull brown or blackish, the entire margins subinvolute in the dry state, oblong to elliptic lanceolate, acute to acuminate at apex, cuneate at base, the larger blades 17.5 cm. long, 6 cm. wide across the middle; midvein prominent, darker in color; the 7 to 9 lateral pairs ascending, curved toward their ends, reticulations coarse and rather faint; petiole 1 to 2 cm. long, glabrous. Inflorescence cymose, axillary, also glabrous; peduncle 1 cm. long, ascending, giving rise to few to several flowers toward the distal end; pedicels recurved, varying from 1 to

2 cm. long, slender, slightly thickened toward the apex; calyx only 3 mm. deep, 5 mm. wide across the top, the rim shallowly and irregularly but usually 5-denticulate or lobulate; corolla segments 5, free except at the very base, rotately spreading, 9 mm. long, 4 mm. wide, oblong, slightly narrowed toward the base, obtuse at apex which is usually puberulent, margins inflexed and also puberulent; filaments flattened, 1.5 mm. long, nearly free; anthers thick, 4 mm. long, opening by terminal slits, basifixed, slightly thinner toward the base; ovary glabrous, truncately dome-shaped, bearing a slender glabrous 5 mm. long style; fruits immature, green, globose, 12.5 mm. in diameter, with numerous flattened seeds imbedded in a fleshy pulp.

Type specimen 11599, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, August, 1909.

Collected in humid woods on a steep ravine at 5000 feet on the trail between Mainit creek and Baclayan on Apo.

Solanum angatii Elm. n. sp.

Epiphyte; stems branched, 1 m. long, grayish white, the free ends mostly descending, forming straggling masses, the whole plant quite heavy and succulent. Leaves coriaceous, also descending, shallowly conduplicate on the upper sublucid surface, the sharply and slenderly acuminate tips recurved, much paler beneath, glabrous, drying brown, exceedingly diverse in size, entire, lanceolate or the smallest ones ovately elliptic, the larger blades 7.5 cm. long, 2.5 cm. wide below the middle, base obtusely rounded, scattered along the branchlets, alternate or occasionally opposite; petiole up to 5 mm. long, glabrous; midvein prominent beneath, the 3 to 5 arcuate lateral pairs faint. Flowers upon glabrous and descendingly curved pedicels 1 cm. long usually in small axillary leaf clusters; pedicels twice as long, in the fruiting state, gradually thickened toward the distal end; calyx also glabrous, 3 mm. long, nearly as broad, the rim usually splitting into 3 to 5 broad lobes, occasionally finely ciliate at the margin; corolla 6 mm. long, the basal 2 mm. long tube rather abruptly constricted; lobes 5, oblongish, obtuse at the finely puberulent apices, 4 mm. long, 2 mm. broad toward the base; stamens 5;

filaments 0.5 mm. long, free, inserted upon the corolla a trifle below the throat, glabrous; anthers 1.5 mm. long, quite thick, basifixed, dehiscent through terminal slits; ovary smooth, dome-shaped, 1.5 mm. long; style slender, 3.5 mm. long, glabrous, bearing an enlarged capitate stigma; fruit smooth, obovoidly globose, 7.5 mm. long, 5 mm. wide above the middle; seeds 2, large, obovoidly compressed, brown pitted.

Type specimen 10762, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, May, 1909.

Discovered upon limbs of a tall tree in a fertile, humid and densely forested flat at 3750 feet, along the trail between Todaya and Apo. Observed only once and was named by the Bagobo "Lawmoos." Named after and old Bagobo whose name is *Angat*. This man has never failed giving me the native name of all plants collected in that region. He is the father of a number of grown up sons and who with them rendered most of my aid. Nearly every excursion taken to mount Apo will always recruit at Todaya one or more members of the family as guides or cargadores.

Leaves less than one half as large and differently shaped than in *S. parasiticum Blm.*

Solanum manucaling Elm. n. sp.

Erect tree, about 10 m. high; trunk 2 to 3 dm. thick, terete, straight; branches crooked, numerous, forming a rather dense elongated crown; wood soft, light, easily splitting, tasteless, slightly odorous, whitish throughout or more of a yellowish tinge in the center; bark gray and finely checked longitudinally, yellowish and lenticelled on the twigs. Leaves coriaceous, ascending or horizontal, conduplicate on the upper dark green surface, recurved especially toward the obtuse or acute apex, the entire margins subinvolute in the dry state, lighter green on the lower side, curing similarly brown on both sides, exceedingly diverse in size, alternate or subopposite, the larger blades 10 to 15 or even more cm. long, 5 to 8 cm. wide across the middle, elliptic to oblong, the base abruptly acute to obtuse or even rounded; midvein very prominent beneath, finely yellowish pubescent, the 7 to 11 lateral pairs similar curved and reticulately united, the inter-

vening reticulations coarse and quite evident beneath; petiole 1 to 2 cm. long, short fulvous pubescent in the young state. Flowers odorless, pendulous in small axillary fascicles or upon short tubercles; pedicels slender, subglabrous, nearly 3 cm. long; calyx green, also subglabrous, broadly cup-shaped, 3 mm. high, 5 mm. wide across the top, truncate, with 4 apiculate points attached on the outside below the thin rim; corolla fleshy, creamy white, 7.5 mm. long, 4-segmented, the basal two thirds united into a broad tube; segments broadly oblong, obtuse, curvingly reflexed, the inflexed margins and apical tooth finely puberulent; anthers 4, inserted upon the corolla, their filaments 1.5 mm. long and flattened, 3 mm. long, very thick and fleshy, opening by oblique slits at the apex; style 2 mm. long, columnar, glabrous, bearing a small stigma; fruit upon 3 to 5 cm. long green stalks, smooth, green when collected, 1.25 cm. thick, subglobose or short ellipsoid, subtended by the small persistent calyx, with numerous flattened seeds averaging 2.5 mm. across.

Type specimens 10489 in flower and 11693 in fruit, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, May and September respectively, 1909.

Both specimen were collected in a fertile densely forested humid flat at 4000 feet. The Bagobos know it as "Manucaling".

Not *S. blumei Nees* which is a shrub, has different leaf and flower characters and much smaller fruits.

Solanum lianoides Elm. n. sp.

Scandent upon lofty trees; stems loosely hanging about the tree trunks, terete, 7.5 cm. thick, heavy; wood porous, very soft, the outer portion reddish, the middle region yellow, the greater central bulk whitish, odorless but with a slight bitter taste, pith minute; bark brown, smoothish; branchlets subpendulous, rebranched, greenish and prickly, rather short and forming masses, covered with fulvous hairs; spines short but sharp, retrorse, more numerous along the lower side. Leaves alternate, widely scattering along the branchlets, quite variable, flat, somewhat membranous, yellowish green, paler beneath, nearly of the same color when dry, the larger blades 1 dm.

long, at least 6 cm. wide, ovate to elliptic or oblong, the sides just above the middle usually obscurely lobulate or merely coarsely sinuate, the broad obtusely rounded base usually inequilateral, apex short obtuse or occasionally acute, densely stellate tomentose on both sides; petiole 1 cm. long, similarly pubescent, usually with a pair of spinules toward the apex on the lower side; midvein yellowish brown in the dry state, with 3 to 5 ascending pairs which are in the larger ones few branched toward their ends. Inflorescence axillary or terminal, upon 5 cm. long green subpendulous peduncles which are sparingly branched and bearing but few flowers, similarly pubescent and spinolose; calyx green, persistent, with 5 filiform teeth or segments; pedicel much thickened and ridged toward the apex in the fruiting state; corolla also thickened, rotately spreading, light blue with darker blue streaks, 2 cm. across, odorless; anthers erect, yellowish green, with brown apical pores; pistil pale white; fruits 3 to 5 cm. long, smooth, light green with coarse deeper green streaks arising from the base, ovately ellipsoid, exocarp thick, 4-celled; seeds numerous, flat, brownish black, imbedded in viscid meat.

Type specimen 10752, *A. D. E. Elmer*, Todaya (Mt. Apo), District of Davao, Mindanao, May, 1909.

A liana-like climber reaching the tops of lofty trees in a very humid, fertile and densely forested basin at 3750 feet. "Togotong" is the Bagobo name.

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LEAFLETS OF PHILIPPINE BOTANY

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NEW SPECIES OF BEGONIA

BY

A. D. E. ELMER

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Begonia lagunensis Elm. n. sp.

Scandent and forming interlaced masses; stem soft, 1.5 cm. thick, watery, covered with a light gray bark; branches glabrous, succulent, reddish, numerous. Leaves alternatingly scattered, copious, descending, rigidly coriaceous and breaking with a snap, glabrous, light green above, paler green beneath even in the dry state, flat, exceedingly variable in size, the smaller ones lanceolate, the larger ones oblong or ovately oblong, the basal portion usually rounded and entire, slenderly acuminate or caudate at apex, margins apiculate or irregularly dentate, the medium sized blades 5 cm. long by 2 cm. wide below the middle, curving, dull green; nerves usually 3 from near the base, the middle one with 1 to 3 side veins, much ascending, the larger ones branched, reticulations obsolete; petiole smooth, 1 to 3 cm. long, reddish; stipule 1 cm. long, linear, running into a sharp point, thin, brown at least when dry, glabrous.

Inflorescence from the uppermost leaf axils, few-flowered, glabrous, 3 to 5 cm. long; pedicels filiform, 1 cm. long, subtended by small folded bracts; staminate perianth segments 2, nearly 1 cm. long, ovately oblong, emarginate at

the base, pink or whitish; stamens numerously clustered in the middle; filaments short, subequal, glabrous; anthers brown when dry, ellipsoid, dehiscent around the apical edge and toward the base; pistillate segments 3, somewhat larger; styles 3, glabrous, bearing obscurely forked brown pulverulent stigmas; seed elliptic, 3-winged, 1.5 cm. wide across the top, gradually tapering from base to the rather conspicuous points.

Type specimens 9327 and 7467, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

Scandent and forming bushes upon small stems 15 feet from the moist humus covered ground in the forests at 4000 feet of mount Banahao.

Begonia negrosensis Elm. n. sp.

Rank terrestrial clump, with several stems from the same root cluster; stem 2.5 cm. thick, greenish brown, 2 to 3 m. long, branched from below the middle, suberect or reclining; branchlets not many, crooked, recurved. Leaves descending, shining green above, much paler beneath, coriaceous, ovately oblong in outline, apex abruptly acuminate, the base obliquely subcordate, margins entire or apiculate toward the apex, sprinkled with brown hairs, the larger ones 2 dm. long, 9 cm. wide a trifle below the middle, frequently much smaller; petiole 2 to 3 cm. long, becoming glabrate, strict; nerves prominent beneath, brown in the dry state, sparsely brown strigose, the main nerve with 1 to 3 lateral ones, about 3 basal ones from the upper side and about 7 basal ones from the lower side, most of them once or twice forked, reticulations obscure; stipule thin, brown, glabrous, oblong, abruptly but sharply pointed, 2 cm. long, 6 mm. wide.

Inflorescence from the uppermost leaf axils, 7.5 cm. long, short paniculately branched above the middle, all the stalks glabrous; pedicels filiform, 2 cm. long, subreflexed, glabrous; flowers subpendulous, pinkish white, subtended by strongly folded brown bracts; staminate perianth segments 2, broadly elliptic, with cordate bases, 1.5 cm. broad; stamens numerous, densely clustered and inserted upon the segments; filaments glabrous, subequal; anthers laterally dehiscent, rounded at

both ends; pistillate segments 3, broadly oblong; styles short, glabrous, bearing obscurely forked brown pulverulent stigmas; seed elliptic, 12.5 mm. long, with the wings 4 cm. across the truncate top, 3-winged, gradually curving from the base to the rather blunt outer point, transversely nerved.

Type specimen 9903, *A. D. E. Elmer*, Dumaguete (Cuernos Mts.), Province of Negros Oriental, Negros, April, 1908.

Discovered in stony moss covered soil of a wind-swept wooded ridge at 5250 feet. Forming dense jungles and well intermixed with other fine undershrubs.

Begonia crispipila Elm. n. sp.

Coarse terrestrial herbs; stems greenish, 1 m. long, branched; its branches somewhat recurved, provided with crisp dull white hairs which turn dull brown in the dry state. Leaves opposite, scattering, diverse in size, the larger blades 1.5 dm. long, 7 cm. wide a trifle above the middle, submembranous, horizontal or descending, drying brown, rich green above, much paler green beneath, obovately oblong in outline, the base very oblique and truncate or obscurely cordate, apex sharply acuminate, the basal or narrower margins entire, otherwise irregularly dentate, some of the upper teeth rather large, crisply pubescent on both sides; petiole similarly pubescent, 1 to 3 cm. long; nerves conspicuous from both sides, the main nerves with 2 or 3 ascending lateral ones, about 4 to 7 secondary basal ones, the larger ones few-forked, reticulations obscure; stipule brown and submembranous when dry, nearly 2 cm. wide, hairy, oblong, abruptly pointed.

Inflorescence short and few-flowered, from the uppermost leaf axils, less than 3 cm. long, in the early state much shorter and subtended by large pubescent bracts, the folded bracts subtending the pedicels or flowers nearly glabrate; pedicels slender, subglabrous, 5 mm. long; staminate perianth segments 2, short ovate, shallowly cordate at base, 6 mm. across; anthers truncately clavate, dehiscent along the edges from apex toward base; pistillate segments 3, oblong, about as long; styles 3, with obscurely forked stigmas; seed elongate elliptic, 3-winged, with the wings 16 mm. wide near the apex, about as high; the wings rather thin, reticulate,

strigose, the widest portion above the middle, the outer points very blunt or obsolete.

Type specimen 8687, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907.

In gravelly soil of a humid wooded gulch along the Irisan creek, a few miles west of Baguio and at 4750 feet. "Caguwan" is the Igorot name.

Begonia gitingensis Elm. n. sp.

Succulent terrestrial herbs; rootstock red, succulent, short, sparingly branched, creeping and forming chumps; petioles ascending or erect, dark red, terete, 1 to 2 dm. long, short brown hairy or becoming nearly glabrous; stipular bracts red, oblong, acuminately pointed, 1.5 cm. long, glabrous; blades rigidly coriaceous, ascending, nearly flat or folded toward the base only, shining deep green above, much lighter or yellowish green beneath, ovate in outline or ovately oblong, the rounded basal portion entire, otherwise irregularly and coarsely dentate or subentire especially along the straighter edge, gradually tapering into the sharply acuminate apex, 1.5 dm. long, 7 cm. wide below the middle; main nerve with 2 to 3 lateral ones on each side and about 3 basal ones on each side, the larger ones 1 to 3-branched, brown and only sparsely strigose no the under side, reticulations obscure.

Inflorescence upon scapes longer than the leaves, erect, glabrous, numerously and finely paniculately branched toward the top only; flowers yellowish white or reddish, subtended by small folded deciduous bracts; pedicels very slender, 5 mm. long, twice as long in the fruit; staminate perianth of 4 very unequal and decussately arranged segments; the outer pair greenish, oblongish elliptic, 5 mm. long; the inner creamy white, less than one half as wide and nearly as long; stamens crowded upon the center, many; filaments very short, glabrous; anthers small, rounded at the apex, dehiscent along the edge; perianth of the pistillate flowers similar; styles 3, short, glabrous, bearing forked pubescent stigmas; seed elliptic, 7 mm. long, 3-winged; the wings 1.5 cm. wide across the middle, similarly curved from both ends, point rounded, transversely reticulate.

Type specimen 12368, *A. D. E. Elmer*, Magallanes (Mt. Giting-giting), Province of Capiz, Island of Sibuyan, April, 1910.

Collected on ledges or in wet stony soil along deeply shaded streamlets at 1750 feet, near the trail toward España. A prettily tufted and erect species!

Begonia leytensis Elm. n. sp.

Delicate terrestrial herb, 2 to 5 dm. high; stems few or several from the same root cluster, more or less decumbent at the base, sparingly branched; the branches ascending, provided with crisp brown dry hairs, slender. Leaves alternate, only sparingly scattered along the branchlets, mostly horizontal, membranous, green when dry, paler green beneath, hairy on both sides especially on the lower, apex slenderly acuminate or even caudate, base oblique with a cordate sinus, oblong or ovately oblong, greatly varying in size, margins irregularly but grossly dentate, the larger blades 1 dm. long by 3 cm. wide below the middle; main nerve with 1 to 3 lateral ones, only 1 or 2 basal ones on the narrower side, 3 to 4 basal ones on the wider auriculate side, the larger ones forked, reticulations not visible; petiole 2 to 3 cm. long, crisply pubescent; stipule 1 cm. long, finely pointed, hairy especially along the margins, linearly oblong, membranous.

Inflorescence from the uppermost leaf axils, 2 cm. long, few-flowered; branches and pedicels subglabrous, subtended by thin greenish ciliate bracts, the latter 1 cm. long; staminate perianth segments 2, white and slightly tinged with red, 7.5 mm. long, broadly oblong or subrotund; stamens many, centrally clustered; filaments very short or none; anthers brown when dry, dehiscent from the broadly rounded apex along the edges toward the base; the 3 pistillate segments similar; styles 3, glabrous, bearing obscurely forked stigmas; seed elliptic; the 3 wings 1.5 cm. wide across the top, the transversely reticulate wings gradually curved from base to the rather conspicuous outer apical points, thin and glabrous.

Type specimen 7255, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

Inhabiting wet gravelly soil or ledges along a wooded streamlet at 750 feet. A rare, rather delicate and spreading species!

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ERRATA

P. 376, l. 8 from top, cut out "oblong"
P. 376, l. 14 from top, insert "inner" between 'the' and 'series'
P. 377, l. 13 from bottom, for ascending read descending
P. 379, l. 4 from top, for insolucral read involucral
P. 380, l. 2 from top, for 18 m. read 8 m.
P. 380, l. 12 from top, for 10 read 20
P. 380, l. 17 from top, insert "pubescent; involucre 8 mm. long", between 'long', and 'similarly'.
P. 382, l. 9 from top, for lanceelate read lanceolate
P. 383, l. 6 from bottom, for toppeed read topped
P. 384, l. 5 from bottom, for philip-pinensis read philippinensis
P. 391, l. 12 from bottom, for llobata read lobata
P. 444, l. 4 from top, for sessilly read sessily
P. 449, l. 10 from bottom, for M. read Mr.
P. 462, l. 3 from bottom, for rambing read rambling
P. 462, l. 8 from bottom, for cariaceous read coriaceous
P. 462, l. 10 from bottom, for from read form
P. 465, l. 12 from bottom, for laxa read laxum
P. 469, l. 13 from bottom, for but read bud
P. 471, l. 3 from bottom, for philippinense read philippinensis
P. 483, l. 11 from bottom, for (Blm.) read (Blco.)
P. 484, l. 11 from bottom, for paucinervia read paucinervum
P. 486, ll 16 & 17 from top, for Clayoxylon read Claoxylon
P. 487, l. 7 from top, for elangatum read elongatum
P. 488, insert "Apocynaceae" between lines 3 and 4 from top.
P. 494, l. 2 from top, for negrosense read negrosensis
P. 512, l. 6 from top, for Igorrotes read Igorotes
P. 517, l. 18 from top, for Rofle read Rolfe
P. 517, l. 22 from top, for subfrutescent read suffrutescent
P. 528, l. 5 from top, for 1 cm. read 1. dm.
P. 535, l. 14 from top, for inequifolia read inaequifolia
P. 538, l. 14 from top, for Timar read Timor
P. 539, l. 18 from bottom, for vidalliana read vidaliana
P. 539, l. 6 from bottom, for piocarpa read apiocarpa
P. 546, l. 4 from bottom, for Miqeul's read Miquel's
P. 549, l. 13 from top, for R. read S.
P. 556, l. 12 from top, for maesaifolia read maesifolia

P. 562, l. 16 from bottom, for scale mossy read scale-mossy
P. 569, l. 13 from top, for encurved read incurved
P. 569, l. 2 from bottom, for befida read bifida
P. 569, insert "Marantaceae" between lines 2 and 3 from bottom.
P. 569, l. 18 from top, place '2' in front of Elmeria
P. 570, l. 5 from bottom, for lobes read leaves
P. 570, l. 8 from bottom, for leaves read lobes
P. 575, l. 6 from top, for M. palustris Benth. read M. kursii Clarke
P. 591, l. 17 from bottom, for Ness read Nees
P. 596, l. 12 from top, for langiflora read longiflora
P. 600, l. 5 from bottom, for Blm. read Wall.
P. 605, l. 1 from top, insert "long" between 'cm.' and 'by'
P. 605, l. 10 from bottom, for 10033 read 10038
P. 606, l. 19 from bottom, for peel read keel
P. 607, l. 9 from bottom, for interval read intervals
P. 612, l. 19 from top, for lamosella read lamellosa
P. 612, l. 18 from bottom, for philippinensis read philippensis
P. 613, l. 14 from top, for Soc. read Sc.
P. 620, l. 6 from top, for Soc. read Sc.
P. 620, l. 5 from bottom, for Manila read Cebú
P. 624, l. 6 from bottom, for Soc. read Sc.
P. 624, l. 13 from bottom, for Calavan read Calawan
P. 624, l. 3 from top, for Soc. read Sc.
P. 625. l. 17 from bottom, for lamosella read lamellosa
P. 628, l. 4 from bottom, for Thurb. read Thunb.
P. 629, l. 17 from bottom, for spicimen read specimen
P. 637, l. 6 from top, for Turcz. read (Turcz.)
P. 639, l. 1 from top, for cathecu read catechu
P. 641, l. 20 from top, for cathecu read catechu
P. 641, l. 3 from bottom, for catechu read catechu
P. 649, for page 449 read 649
P. 658, l. 8 from bottom, for Occidental read Oriental
P. 677, l. 5 from bottom, for 5 read 3
P. 681, ll. 8 & 9 from bottom, for Meisner read Meissner
P. 683, l. 14 from bottom, for H. Br. read Baill.
P. 688, l. 3 from bottom, for "apparently the same" read "a close ally"

P. 689, ll. 6 & 16 from bottom, for Whitfordia read Whitfordiodendron

P. 691, l. 8 from top, for basiufixe read basifixed

P. 692, l. 3 from bottom, for inflorence read inflorescence

P. 701, l. 6 from top, for specimen read specimens

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